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1.013 PRELIMINARY RESULTS OF THE EXPLORATORY FISHING SURVEYS FOR "LANGOSTINO" AND SHRIMP AT RAWSON, 1962-1963

Boschi, Enrique E. (Instituto de Biología Marina, Mar del Plata, Argentina), and Michael N. Mistakidis (Organización de las Naciones Unidas para la Agricultura y Alimentación)
CARPAS, Documentos Técnicos No. 6, pp. 1-16 (1966) (Comision Asesora Regional de Pesca Para el Atlantico Sudoccidental) (In Spanish, English abstract) (FAO, Rio de Janeiro, Brazil)

During the last decade, the yield of langostino [prawn] (Hymenopenaeus müller-eri) and shrimp (Artemesia longinaris) from the coastal waters off the port of Rawson, Argentina, has declined markedly. Commercial fishing for these crustaceans began in 1947 and, until 1952, the catch increased yearly in the region lying between lat. 43°00' and 43°45' S. Since 1952, the catches of prawn and shrimp have decreased, though not in a direct line yearly. Because of the importance of this fishery, investigations were begun to determine the local oceanographic conditions and the effects of the environment on the prawn and shrimp and on the fluctuations in the fishery.

Exploratory cruises were conducted during the summer of 1962 and spring of 1963. Hydrographic data were obtained; almost 180 determinations of temperature were made; and several water and plankton samples were taken. More than 10,000 specimens of prawn and shrimp were examined from the samples collected. Systematic
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1.0156 FISHERIES AND FISH CULTURE IN ISRAEL IN 1965

Sarig, S. (Laboratory for Fish Diseases, Nir-David, D.N., Israel)
Bamidgeh 18, No. 2, 37-50 (June 1966)

The total catch of fish by Israel in 1965 was 19,513.6 tons, which was an increase of 783 tons (4.2 percent) over the 1964 catch. The Mediterranean trawl fishery, the pelagic fishery, and the Atlantic fishery accounted for an increase of 1,313 tons. The inshore fishery, tuna fishery, and fishpond production declined by a total of 579 tons. The following is a breakdown of the 1965 catch: fish ponds produced 10,199 tons (52.3 percent of the catch); Mediterranean trawl fishery, 761 tons (3.9 percent); Red Sea trawl fishery, 686.7 tons (3.5 percent); inshore fishery, 552.2 tons (2.8 percent); pelagic fishery, 1,596.9 tons (8.1 percent); Atlantic deep-sea fishery, 3,802 tons (19.6 percent); tuna fishery, 583 tons (3.0 percent); and inland fishery, 1,332.8 tons (6.8 percent).

The total catch increased by 82 percent from 1956 to 1965. During that time, fishpond production increased by 2,900 tons, Mediterranean and Red Sea production, by 1,100 tons, and production from Lake Kinereth by 400 tons.

Fresh and frozen fish account for 80 percent of the total fish consumption in Israel. A 1.0-percent increase in per-capita consumption of all types of fish

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1.0150 ON THE POSSIBILITIES FOR FURTHER DEVELOPMENTS OF THE SOUTH EAST ASIAN FISHERIES

Tiews, K. (Institut für Küsten - und Binnenfischerei der Bundesforschungsanstalt für Fischerei, Hamburg, West Germany)
Current Affairs Bulletin, Indo-Pacific Fisheries Council, No. 47, 1-13 (December 1966)

From 1960 to 1964, fisheries production in Southeast Asia (excluding mainland China) increased from 4.5 to 5.8 million tons at a rate of about 7.0 percent per year. The increase was unevenly distributed among the nations in the region--Cambodia, India, and Pakistan showed an increase of 11-14 percent in fisheries production; Ceylon and Taiwan, 66-69 percent; and Thailand, 161 percent. Seventy percent of the population of the entire region live in the three countries with the smallest increase and the increase has not been great enough to offset the rise in population. The present development of fisheries is also uneven; in 1964, the catch of fish per capita ranged from 40 kilograms in Brunei to 3 kg. in India and Pakistan.

A wide variety of fishing gear is in use, including many types of rather ineffective gear such as fish corrals, set bag nets, hook and lines, long lines, gill nets, and beach seines. More modern gear, such as purse seines and trawls, are not in wide use in the area and are not widely recognized as valuable for rapid expansion of fisheries yields. This situation is considered all the more
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1.953 (*) WHAT HAPPENED TO THE HUMPBACK WHALE?

Bootle, K.
Australian Fisheries Newsletter 25, No. 12, 17, 19, 21 (December 1966)

The humpback whale (Megaptera nodosa) once had a wide distribution in all the oceans of the world. Since the early 1950's, it has become progressively scarcer in Australian waters. Exploitation of the humpback as a source of food, oil, and fertilizer is the sole cause of the drastic decline in population.

Two of the five virtually self-contained groups of humpbacks in the southern hemisphere (Groups IV and V) migrate to Australian shores because the humpback prefers shallow coastal waters during its breeding season. The whales seldom eat during their winter migration to temperate zones and live on stored fat for about 4 months a year. This is the reason that oil yields decline as the shore-based whaling season progresses. Oil production is directly related to length, and the larger females produce more oil than males of similar age do. It is believed that mature females carrying near-term fetuses yield the most oil.

Group IV population of whales migrates to the Western Australian coast; Group V migrates to the east coast of Australia, New Zealand, and the islands of the southwest Pacific. By 1939, the Group IV population had already been so seriously depleted by hunting that they were fully protected from 1939 to 1949. The Group V population was only sparingly hunted before 1950.

*Item on back of card.

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ARGENTINA PRAWN AND SHRIMP CATCH

POTENTIAL OF SOUTHEAST ASIAN FISHERIES

ISRAELI FISHERIES

DECLINE OF HUMPBACK WHALES

1.0150

surprising in view of the fact that the area comprises one faunistic region and that the technical problems involved in fishing are similar throughout the region.

The two major sources of fish available in Southeast Asia are the pelagic or midwater fish, and the demersal or bottom fish. The demersal fishery has the most potential for fisheries expansion, since it is little developed anywhere in the region. An exception is Thailand, where rapid fisheries development since 1960 reflects the adoption of trawl-net fishing for demersal fish. The author estimates that about 6.5 million tons of demersal fish are left unharvested each year in the area. If these fish were harvested, total fisheries production in the area could be more than doubled. The author concludes that about 6,500 fishing vessels, 20 meters long with engines of no more than 250 horsepower, would be required to economically produce this yield.

The pelagic fisheries offer less potential for development since pelagic fish have been the major source harvested. With the introduction of more modern methods of fishing the author believes it would be possible to increase yields by about 1 million tons per year.

The potential of mussel farming is several million tons per year, if the proper farming techniques and the markets for mussels are developed. Fish farming could also add another million tons per year to fisheries production, but development would not be as rapid as that of the other potential sources.

1.953

Although regulation of the world's whaling industry has been under discussion for many years and was the subject of a Geneva Convention as early as 1931, it has proved to be a particularly difficult problem. Discussions began because depletion of stocks was so serious that some species were in danger of extinction. Since whales produce such a small number of offspring, the number of adults is a crucial factor in maintaining stocks. The various international agreements governing whaling have had only limited effect because they have not had the support of all whaling nations nor have they been adequately enforced. In 1945, the Group IV humpback population was estimated at 12,000-17,000 whales. By 1949, this figure dropped to 10,000 and by 1962 the population was estimated at 800. During the same time, the Group V population dropped from an estimated 10,000 to less than 500. The shore-based Australian whaling industry that began in 1949 has been forced to shut down. It is estimated that it will take the Group IV population 40 years and the Group V population 50 years to reach their 1949 levels, assuming that hunting is completely stopped. The author concludes that the future of the world whaling industry is gloomy and long-run interests have been sacrificed to short-run exploitation.

1.953 STUDIES ON THE ANTARCTIC WHALE OILS
BY GAS-LIQUID CHROMATOGRAPHY USING A HYDROGEN FLAME
IONIZATION DETECTOR. IV - ANALYSIS OF THE BRANCHED-CHAIN
FATTY ACIDS FROM BLUE WHALE BONE OIL

Sano, Yoshihiko
Journal of the Japan Oil Chemists' Society 15, No. 4, 140-147 (1966)

(Abstract of this article appears under 4.11 page 11 - April 1967)

1.013

studies were made on the capture conditions of prawn and shrimp, and biological data on these species were collected. In certain cases, these studies were extended to the fish species of commercial importance in the region. Due consideration was given to the environmental conditions, water, and climate for the purpose of correlating the environment with fluctuations in the fishery.

The investigation showed that fish are the most numerous, followed by crustaceans. Altogether, about 70 species of fish and crustaceans were observed, though season and location affected abundance.

Fishing is carried on in this area primarily from October to March. The area is part of the Patagonian temperate coastal waters, and temperatures may reach a maximum of 20° C. in summer and a minimum of -9° C. in winter. The yield of both species varied greatly during the season, depending primarily on the climatic conditions and time of capture. The average weekly capture of prawn made by all boats fishing in the area from the first of January to mid-March 1962, varied from 14.0 to 56.4 kilograms per hour. During the same period and at the same place, the average weekly yield of shrimp varied from 2.5 to 19.9 kg. per hr.

In addition to the crustacean catch, the fishing boats of Rawson usually gather some fish of commercial value. These fish are frozen, salted, or dried and are sold within Argentina. The authors noted that good catch conditions are to be found in these waters for hake, "sea salmon" (Pinguipes sp.), "pez gallo" (Callorhynchus sp.), shark, sea bass, and flat fish.

1.0156

to 10 kg. per capita increased total consumption by 1,094 tons. A decrease in per-capita consumption of pond fish and imported salted and filleted fish was offset by increased consumption of local and Atlantic fish. Local production accounted for 75.6 percent of the total consumption of fish, which increased by 2.1 percent over 1964.

Lake Kinereth continued to supply 96 percent of the total inland fisheries catch. The remaining 4 percent of the inland catch came from the Jordan River. Fishing in the Huleh Canals was abandoned because it became unprofitable.

At the end of 1965, a surplus of about 1,500 tons of live carp remained in storage ponds at the fish farms. A decrease in demand led to a drop in sales of pond fish for the first time in 9 years. Reasons for the decreased demand for carp are a shift in consumer preference to frozen hake from the Atlantic deep-sea fisheries; a refusal on the part of the Israeli consumer to eat fish with a high body-fat content; increase in the carp's body-fat content during prolonged storage in small ponds; and a rise in the cost of carp because of rising production costs. Aggravating the situation was a large increase in the production of fish ponds that resulted from an increase in total area of fish ponds and a dividend on years of experimentation with stocking policy, feeding, control of diseases, and other areas of fish culture. The carp were the only pond fish remaining in surplus; the entire production of Tilapia and grey mullet was sold in 1965. Nevertheless, the share of pond fish in total consumption dropped to 4.0 kg. per capita (39 percent) in 1965.

2.01 TIME-TEMPERATURE EFFECTS ON THE BACTERIOLOGICAL QUALITY OF STORED SHELLFISH. I - BACTERIOLOGICAL CHANGES IN LIVE SHELLFISH: PACIFIC OYSTERS (CRASSOSTREA GIGAS), OLYMPIA OYSTERS (OSTREA LURIDA), NATIVE LITTLENECK CLAMS (PROTOTHACA STAMINEA), AND MANILA CLAMS (VENERUPIS JAPONICA)

Hoff, J. C., W. J. Beck, T. H. Ericksen, G. J. Vasconcelos, and M. R. Presnell
(Northwest Shellfish Sanitation Laboratory, Gig Harbor, Washington)
Journal of Food Science 32, No. 1, 121-124 (January-February 1967)

Commercial practice on the West Coast is to store shellfish alive after they are harvested. Oysters are held on barges or are transported to shucking plants and stored live until they are shucked and packed. Clams may be held in this condition even longer than oysters because they are sold live to the consumer. Except for some evaporative water loss and gas exchange with the surrounding atmosphere, shellfish become essentially a closed system upon capture. Contained within this closed system are a considerable number of microorganisms ingested from the water in which the shellfish live. These microorganisms remain with the shellfish through all subsequent phases of marketing. The effect of storage time and temperature on bacteriological changes in live shellfish is reported in the present article.

Four species of commercially important shellfish were examined: the Pacific oyster (Crassostrea gigas), the Olympia oyster (Ostrea lurida), the native littleneck clam (Prototheca staminea), and the Manila clam (Venerupis japonica). The
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2.03 DEGRADATION OF NUCLEOTIDES IN ICE-STORED HALIBUT

Spinelli, John (Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington 98102)
Journal of Food Science 32, No. 1, 38-41 (January-February 1967)

Investigators have found that the quality of ice-stored fish is related to the nucleotides in the fish's tissue and to their degradation products. Nucleotide dephosphorylation--especially the accumulation of hypoxanthine--in fish tissue has been shown to correlate with the time the fish had been stored in ice. Kuninaka et al. (1964) found that the 5'-nucleotides are particularly important components of flavor in fish since they bring out inherent flavor. Miyauchi et al. (1964) found that the addition of 5'-inosine monophosphate (IMP) to low-dose-irradiated petrale sole fillets would restore some of the flavor lost during iced storage.

Standard tests for the determination of spoilage in fish are based on the measurement of the metabolic end products of bacteria. The measurement of 5'-nucleotides and hypoxanthine, however, provides information on enzymic deterioration, the rate of which is not the same in different species of fish. Among the subjects covered in the present article are the rate of nucleotide dephosphorylation, the rate of hypoxanthine accumulation, and the distribution of nucleotides and hypoxanthine in halibut.
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2.01 TIME-TEMPERATURE EFFECTS ON THE BACTERIOLOGICAL QUALITY OF STORED SHELLFISH. II - BACTERIOLOGICAL CHANGES IN SHUCKED PACIFIC OYSTERS (CRASSOSTREA GIGAS) AND OLYMPIA OYSTERS (OSTREA LURIDA)

Hoff, J. C., W. J. Beck, T. H. Ericksen, G. J. Vasconcelos, and M. W. Presnell
(Northwest Shellfish Sanitation Laboratory, Gig Harbor, Washington)
Journal of Food Science 32, No. 1, 125-129 (January-February 1967)

Fresh, shucked Pacific oysters (Crassostrea gigas) and Olympia oysters (Ostrea lurida) have a high bacterial content when packed. The bacterial levels greatly increase between the packing and the marketing. The present article reports the effects of storage time and temperature on changes in various bacterial indices applicable to commercially shucked and packed oysters. The indices used to check the bacteriological quality of the shucked oysters were pH, coliform most probable number (MPN), fecal coliform MPN, and standard 35° C. plate count.

When the initial period of stability for standard 35° C. plate count levels was 4 days and 7 days, respectively, Olympia and Pacific oysters were stored in crushed ice. After this initial period, the plate counts for both species rose uniformly at about the same rate; each tenfold increase in bacteria required about 5 days. Storage at 3° C. reduced the initial period of stability to 2 days and 4 days for Olympia and Pacific oysters, respectively. After the initial count, the bacterial proliferation was much the same as during iced storage, except that
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2.1121 HYDRODYNAMIC PROPERTIES OF THE TWO-BOAT MID-WATER TRAWL--I

Taniguchi, Takeo (Shimonoseki University of Fisheries, Shimonoseki, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 32, No. 12, 998-1005 (December 1966) (In English)

There are two types of midwater trawls: those designed to be used by one boat, and those designed to be used by two boats acting together. The one-boat trawl is in use in the Pacific Coast fisheries of North America. The two-boat trawl, developed in Denmark in 1948 and called the Larsen net, is in use in Northern Europe and is particularly important in herring fisheries. Neither of the midwater trawls has been adopted for commercial use in Japan, but Japanese scientists have been conducting trials with both types.

The present article deals with the hydrodynamic properties of the Larsen type of two-boat midwater trawl. Both sea trials and model experiments were conducted to find out proper speed for towing the net, proper size of the gear, effect of shape and weight of the gear on the towing depth and shape of net in the water, and effect of the distance between the two tow ships on shape of net in the water.

Preliminary sea trials showed that the gape height did not exceed 5.5 meters when the trawler speed was 2.8 to 3.0 knots. This height was in contrast to an expected gape height of about 8.0 meters. It is believed that the pendants were
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2.01

only 3 days was required for each tenfold increase in bacteria. When the oysters were stored at 10° C., the initial period of stability was only 1 day for both species, and each tenfold increase in bacteria required less than 24 hr.

The rate of change of the coliform MPN was similar in both species at each of the three storage temperatures. The rate of change correlated with storage temperature, being much more rapid at 10° C. than at 0° C.

The fecal coliform MPN decreased slightly in both species during storage in ice and at 3° C. At 10° C., two different types of fecal coliform MPN occurred in each species. The fecal coliform MPN remained relatively stable in 6 of 15 lots of Pacific oysters and in 9 of 12 lots of Olympia oysters. After an initial 1- or 2-day period of stability, the fecal coliform MPN of the other lots increased rapidly. The rate of increase in Pacific and in Olympia oysters indicated respective generation times of 24 and 13 hr.

The pH changes showed little correlation with the bacteriological changes, so the authors suggest that pH is a poor indicator of bacteriological quality in oysters. In contrast, a combination of the 35° C. standard plate count, which correlates well with storage temperatures, and the fecal coliform MPN, which reflects known patterns of increase for pathogens, may be the best means of assessing the sanitary quality of oysters. [16 references]

2.1121

too long and were fouling each other, so the author suggests that the pendants should be no longer than 30 meters.

During the model experiments conducted in an aquarium, the horizontal extension at the mouth of the net depended on the distance between the pendant swivels, which in turn depended on the distance between the boats. The hydrodynamic resistance of the net, therefore, also depended on the distance between the boats. The author concludes that the ideal distance between the pendant swivels for the two-boat midwater trawl is 30 meters.

Towing speed was found to be the controlling factor affecting the vertical opening of the net at its mouth. The greater the speed at which the net was towed, the smaller the vertical opening. In the model experiments using a speed of 2.8-3.0 knots, a somewhat greater vertical gape was attained than the gape attained with the same speed in sea trials. However, other factors, such as the distance between pendant swivels, were not equal in the two experiments.

The pendant weights were found to affect the working depth and the vertical extension of the two-boat trawl. Weights of 200 kg. were found to be necessary to maintain stability in the working depth and vertical extension. If these two factors were ignored, 60 kg. weights would be adequate. [12 references]

2.01

following indices were used to determine the microbiological quality of each: coliform most probable number (MPN), fecal coliform MPN, and the 35° C. standard plate count.

The 35° C. plate counts showed a bacterial increase of tenfold or less in Olympia oysters and in Manila clams that had been stored for from 15 to 20 days at 10° C. The Pacific oysters and native littleneck clams had an increased plate count of 20- and 100-fold when stored under the same conditions. When the shellfish were stored at 20° C., the changes were of about the same magnitude as those at 10°, but they occurred within 7 or 8 days. When the shellfish were stored at 27.5° C., the Olympia oyster was the only species to survive for longer than 3 days. The changes in the plate count were again of the same magnitude, but again they occurred much more rapidly than at the lower storage temperatures. The coliform MPN remained fairly stable in all species for from 15 to 20 days' storage at 10° C. At 20° C., the coliform MPN showed a marked total increase in the Manila clams and the Pacific oysters but remained stable in the other two species. The major effect of storage at 27.5° C. was to accelerate the changes that occurred at 20° C.

The fecal coliform MPN remained fairly stable in all species at 10° and 20° C. storage. It definitely increased in the Pacific oysters at 27.5° C. storage, whereas in the other species it became erratic at this temperature.

Since the storage temperatures used in this study fall within the range that can be expected during commercial handling of shellfish, the authors conclude that low-temperature storage and rapid handling are desirable for maintenance of good bacteriological quality in shellfish stock.

2.03

The author found that dephosphorylation of nucleotides in iced halibut was relatively slow, following the pattern proposed by Jones in 1963. More than one-fourth of the original nucleotide content was still present after 21 days' storage. His studies on other fish (1964) showed that dephosphorylation of nucleotides was almost complete after 8 to 12 days' storage. Therefore, he suggests, the IMP content of halibut stored in ice for 21 days should be above the flavor-threshold level for this compound. This suggestion is consistent with the general observation that textural changes are more important to the eating qualities of halibut than flavor changes are.

The rate of hypoxanthine accumulation was low, widely varied among the sample fish, and apparently unrelated to the size of the fish. After 21 days' storage, only about one-half of the IMP had been converted to hypoxanthine.

Hypoxanthine and IMP in halibut were distributed fairly evenly except in the samples of dark meat from near the lateral lines of the fish; however, variation between different parts of a fish did not exceed variation between fish.

Results of the rate and distribution studies indicate that the measurement of residual nucleotides and hypoxanthine could provide an objective check on whether halibut had been stored for over 2½ weeks in ice. Unlike bacterial spoilage, nucleotide degradation and hypoxanthine accumulation begin shortly after the death of the fish and are not affected by iced storage.

2.1121 STERN TRAWLING REVOLUTION CONTINUING

Noel, H. S.
Australian Fisheries Newsletter 25, No. 11, 24-25 (November 1966)

Technical problems caused by the change from side to stern trawling, and their solutions are discussed in this article.

The initial problems were related to the technique of getting the trawl on deck and hoisting the cod end to empty the trawl. The first commercial deep-sea stern trawlers were large vessels, so handling the net was not a serious problem. As smaller vessels took up stern trawling, the trawl deck became too short to bring in the net in two heaves. Special winches, capstans, and gantries were developed and installed on these smaller boats to haul the net in stages. On large trawlers, this system has been standardized and is now in use. The main drums of a four-barrel winch are used to haul the doors to the transom, while the auxiliary drums haul the bridles until the bobbins nest around the curved breakwater. Separate winches bring in the rest of the trawl and the cod end.

The next changes came in design and construction of trawls. The newer, larger vessels had a greater towing capacity, which led to larger trawls and otter boards. These changes in turn required changes in ground gear. The combination of larger net and the method of hauling it up a stern ramp imposed strains on the net,

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 ABSTRACTER: E. R. Weissman

2.115 SMALL TRAWLER DESIGN

Noel, H. S.
Commercial Fishing 5, No. 3, 8-10 (November 1966)

In the past 5 years, significant changes have been introduced in the design of small and medium trawlers. Economy, increased efficiency, and added crew comfort have all contributed to the departure from conservatism in trawler design.

The first changes came in the handling of nets. It had always been assumed that a stern trawler would not be practical unless the whole trawl could be heaved in at once. A new stern gantry has made it possible to heave in the trawl by stages. The same hydraulic swinging gantry can be used to handle the trawl doors and to lift the cod end and swing it inboard. This development has led to experiments with just lifting the cod end to empty it.

Further innovations in small trawler design concerned placement of the wheelhouse and new means of controlling both the boat and the net handling equipment. Traditionally, small trawlers had their wheelhouses aft, possibly to allow the skipper to tend the tiller and the main sheet. The new boats have the wheelhouse just forward of midships, though not too far forward because an earlier attempt at this particular change proved unsuccessful. In addition, the new boats use a "semisealed" engineroom arrangement in which engine and propeller-pitch controls are located in the wheelhouse. Winches on these boats are operated from a console in the wheelhouse. One builder demonstrated the ease of net handling with

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 ABSTRACTER: E. R. Weissman

2.1128 HARVESTING LOBSTERS WITHOUT A BOAT
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Anonymous
New Scientist 33, No. 535, 460 (March 9, 1967)

The commercial canning of lobsters requires a constant supply of raw material to the factory. Rough seas, however, prevent the harvesting of lobsters because it is often impossible to lift lobster traps in rough water. A more consistent approach than harvesting by boat is needed for large-scale lobster operations. This approach has been taken, and a new system of cabling lobster pots and similar gear out into rough seas has been developed and patented in Ireland.

A cable is made into an endless underwater loop and secured between two towers. The lobster pots, floats, and hydrofoil anchors are then attached to it. At slack tide the cable is winched in and the gear is removed. This gear is then replaced on the out-going cable.

The success of the system depends to a great degree on the special type of hydrofoil anchor involved. This anchor has hydrovanes placed in such a way that they are self reversing in tidal currents. If a strong wind rises, the force of the water on the vanes causes the spiked feet of the anchor to be driven hard into the sea bed. When there is virtually no current at the turn of the tide, the downward force on the vanes is gone and the anchor can then be easily lifted. If

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*Item on back of card.

 ABSTRACTER: M. M. Gwin

2.115 HIGH SPEED GILLNETTERS

Brandlmayr, John
Western Fisheries 73, No. 2, 42, 44, 75-76 (November 1966)

The characteristics and applications of the planing hull form to fishing vessels are discussed. These high-speed hulls have been in use by military, pleasure, and some commercial craft for a long time. Planing hulls were first introduced in the Pacific Coast gill-net fleet about 15 years ago. Because of insufficient knowledge and poor control of construction, development of the hull form has been hampered, and performance has often been less than anticipated. In particular, relatively heavy vessels with marginal power fail to perform as intended, and fishing-vessel adaptations fall into this category. The author, who is a naval architect, believes that builders and operators do not realize the critical importance of weight and efficient propulsion to this type of craft, and that designers tend to calculate for ideal conditions, thereby aggravating the problem.

The high-speed planing hull is of greatest advantage where labor is expensive and fishing seasons are short--conditions that exist in the Pacific Coast gill-net fishery. In the Pacific Coast fishery it is important to reach the fishing grounds rapidly and to move at high speed with a light load, since a full load is rarely carried. To achieve these characteristics the hull must be of suitable form with adequate power and the operational weight of the craft must be much lower than is

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 ABSTRACTER: E. R. Weissman

STERN TRAWLING GEAR

A NEW LOBSTER TRAP

CHANGES IN TRAWLER DESIGN

PLANING HULLS

2.1128

the vanes need to be moved at any other time, it can be done simply by pulling hard on the cable. This new method is ideal for any type of weather and in places too dangerous for boats. The cost is estimated to be a little more than that of the gear for a modern inshore fishing vessel. However, to install this system accurate hydrographic surveys must be made to locate places that will be satisfactory for its use.

2.1128 PRAWN TRAP YIELDS RECORD CATCHES, CALLED REVOLUTIONARY

Anonymous
Fishing Gazette 82, 9 (January 1965)

A new, galvanized steel prawn trap that has yielded record catches is being used in Irish and Scottish waters. The trap has a small mesh and is so constructed as to settle to the bottom right side up. One of the features is a door at the end whereby the catch can be poured out upon release of a toggle. Another is speed of handling. It is reported that one Scottish fisherman and his three-man crew had no trouble working 220 creels in 2 hours; and, with improved deck gear, they expect to improve the performance. Still a third feature is its contribution to fishery economy. The traps are as effective as trawls, yet the destruction and suffocation of prawns caught beneath a trawl is absent. [Abstracter: L. Baldwin]

2.115

allowable on a conventional vessel. The vessel must also be able to carry a load of fish almost as great as that of a conventional craft if it is necessary. The hull will only be able to plane when in lightly loaded or unloaded condition. The vessel must be seaworthy in both light and loaded state, although speed might be reduced to suit weather conditions.

A typical high-speed fishing vessel hull is illustrated by a 36-foot gill netter. It is characterized by fine forward sections to minimize pounding, flat after sections for most efficient planing with limited power, and a relatively heavy hull. The hull is narrower than most planing hulls because it is designed for use over a wide range of speeds. Performance data are reproduced in three-dimensional graph form in the article. The speed-power curve rises in typical fashion until the spray rails start to clear the water, at which point a small increase in power produces a large increase in speed.

The normal engine to go with such a craft is a light, high-speed gasoline engine of about 425-cubic inch displacement, producing about 280 horsepower at 4,000 r.p.m., driving through a 2.5 to 1 reduction gear. Diesels have usually proved unsatisfactory because of high weight and low power; however, a few high-speed diesel installations have worked successfully. The author believes that further developments in hull design and lightweight construction will allow powering by high-speed diesel engines in the future.

2.1121

requiring heavy reinforcement. Wire rope running the length of the trawl to the cod end was added. The "twin trouser" cod end was introduced to lessen the chance of losing the whole catch, to reduce the size of the bag being hauled up the ramp, and thereby to reduce both friction and crushing of fish.

In stern trawling, the warps remain connected to the doors, so it was no longer possible to hang the trawl door in dog chains at the gallows and use the warps to haul the bridles. Instead, messenger wires from auxiliary winches were run out to the "pennants," or connecting pieces, to haul the bridles. These bridles must be hauled up the ramp to keep the stern trawl in its natural attitude. Separate winches were used to speed up this operation, which had the added advantage of reducing the number of messenger wires lying around on deck.

The nets have also changed. Research on hydrodynamics and the greater towing ability of the stern trawlers have allowed the use of nets with greater headline height. The use of floats on the selvages lengthener and on the cod end keeps the net off the sea bed, and reduces mechanical deterioration of the net.

Because the stern trawler's warps run straight aft, several innovations were made feasible. It is now possible to measure warp length, and to use mechanical warp-spooling or guiding-on gear. This gear offers the possibility of using a revolution counter on the winch barrels to measure both the amount of warp out and the leveling of the two warps. It is also possible to measure the load on each warp, thereby gaining information of fouled gear, uneven warp length, and the contents of the cod end.

2.115

the new design by shooting and hauling the gear with just the help of his 17-year-old daughter.

In addition to being much more economical of crew use, the new designs provide for the comfort and safety of the workers. Workers can now gut fish at waist level, under cover on a dry deck. There is much more mechanization and much less manual pulling and hauling involved in fishing on the new boats. This is considered extremely important to the recruiting and maintenance of an adequate number of crewmen for the fleet.

The new designs also have two drawbacks. In short, steep seas, a rougher ride may be experienced in a forward wheelhouse. Furthermore, the engine usually has to be placed forward, necessitating a longer shaft with attendant possibilities of vibration. Yet the advantages of a sheltered, uncluttered deck and easier maneuverability are considered to outweigh by far the disadvantages.

2.115 STABILISATION SYSTEMS

Anonymous
World Fishing 15, No. 12, 25-27 (December 1966)

Two basic systems exist for stabilizing vessels. One system (mass transfer) involves the transfer of mass within the vessel to counteract roll; the other system (hydrodynamic damping) uses the force of the surrounding water to exert a stabilizing effect on surfaces outside the hull such as fins and bilge keels.

The hydrodynamic damping system may be either active or passive. Roll damping fins are an active system; they depend on their surface area and the speed of the vessel for the stabilizing effect. Because fishing vessels spend much of the time at slow forward speeds, damping fins are impractical. Bilge keels constitute a passive system that has been used on fishing vessels for many years. The keels must have a very large surface area to be really effective, but this large area makes them subject to damage and increases resistance. These keels have rarely been used on side trawlers because of the danger of fouling gear. A passive system known as the "flopper stopper" is in wide use among United States fishermen for stabilizing small boats that either are at rest or are moving slowly.

Mass transfer systems may also be active or passive, and the mass may be either liquid or solid; however, only liquid systems have been developed. The
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 ABSTRACTER: E. R. Weissman

2.116 LOGGING TRAWLER PERFORMANCE

Anonymous
World Fishing 15, No. 9, 39 (September 1966)

Data-logging systems have been installed on three British stern-freezer trawlers to record the performance of fishing vessels in service. The Industrial Development Unit of the White Fish Authority hopes the information recorded will lead to improvements in the design of vessels. The systems are less expensive and less bulky than are those used on large merchant ships.

The heart of the system is a digital voltmeter-type data logger that is capable of recording 20 separate variables with the addition of a tape puncher. Information can be recorded at frequencies from 20 seconds to 2 minutes. The basic equipment costs about £1,600, and the sensing devices, wiring, and auxiliary equipment cost another £500. The only maintenance necessary at sea is the occasional loading of new paper tapes.

Readings being taken by loggers now in operation are ship's speed and heading; wind speed and direction; propeller shaft torque; propeller pitch, thrust, and revolutions per minute; propulsion power-selector position; intake manifold pressure; main engine fuel flow and fuel rack position; trawl warp loads; and sea and air temperatures. This information is recorded once an hour while the vessel is steaming and once every 10 min. while it is fishing.
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 ABSTRACTER: E. R. Weissman

2.117 RED AND WHITE OAK IN BOAT CONSTRUCTION

Smith, Roger S. (Forest Products Laboratory, Department of Forestry and Rural Development, Vancouver, British Columbia)
Western Fisheries 73, No. 2, 31, 33, 77-82 (November 1966)

The author reports that the reputation of oak for durability originated in Europe and has led to certain misconceptions among shipbuilders. The European-based reputation of oak does not take into account the differences in variety between European and North American oak, nor the fact that at least 12 species of oak may be used for construction of boats in North America. The present article describes the characteristics of different types of oak, how to make the best use of each type, and what to look for when buying oak.

Basically, the two types of oak in North America are red and white oak. The difference between the two types is based partially on the color of the fresh heartwood. There are two other differences of major importance to the ship builder. White oaks are generally more resistant to fungal decay than are red oaks. However, wide variation in durability exists between various species grown under different conditions. Generally, white oak is about twice as durable as red. The heartwood of white oak contains naturally occurring chemicals that are toxic to some fungi. The other difference is that red oaks are more porous than white oaks. This porosity makes them amenable to pressure application of preservatives, whereas the white oaks will only accept a superficial coating of
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 ABSTRACTER: E. R. Weissman

2.117 FERRO-CEMENT IS HOTTEST THING IN BOATBUILDING

Gardner, John
National Fisherman 48, No. 3, 6b-7b (June 1967)

Ferro-cement is the name given to steel-reinforced concrete and this material was used in the construction of a sloop in New Zealand as long ago as 1887. Although ferro-cement construction has been known as a boat-building process for many years, it has only been sporadically exploited. It is believed that popular fallacies about the nature of concrete have retarded development of ferro-cement as a material for the building of boats. The high cost of building boats with conventional materials and methods has prompted builders and designers to look for other methods and materials. Recently, great interest has been shown in the construction of ferro-cement boats. Several companies in New Zealand, Canada, and the United States are producing ferro-cement hulls for many different uses.

The Fishery Resources and Exploitation Division of the Food and Agriculture Organization of the United Nations is interested in building a prototype fishing-boat hull of ferro-cement, and in recording building methods and procedures on an educational film for use in developing nations.

A great number of advantages are claimed for ferro-cement construction of boats and no major disadvantages are reported in the present article. The ferro-cement process is relatively inexpensive, particularly in regard to materials. Materials for the hull and deck of a 30-foot ferro-cement launch cost $150. A
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 ABSTRACTER: E. R. Weissman

FISHING VESSEL STABILIZATION

DATA-LOGGING EQUIPMENT FOR TRAWLERS

OAK FOR BOAT CONSTRUCTION

FERRO-CEMENT FOR BOAT BUILDING

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Owners of fishing vessels may want to record other data relating to performance and maintenance--such as the temperatures of the engine exhaust, cooling water, and lubricating oil; oil pressures; and fuel and oil levels. The system is capable of recording this information; and, if the proper sensing devices are connected to it, the system can be set to trip automatic alarms or shutdown devices.

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naval architect has designed a 55-foot ferro-cement motor sailer, which can be produced for under $10,000, exclusive of sails and auxiliary power. The same boat, constructed of fiberglass, would cost almost $50,000. This price difference reflects savings not only in material costs, but also in labor.

In addition to being relatively inexpensive, ferro-cement has other qualities to recommend it as a boat-building material. This steel-reinforced concrete is resistant to corrosion, rot, fire, and worms and requires very little maintenance. Ferro-cement is said to be as strong as steel and, contrary to popular belief, is not brittle; it is flexible and highly resistant to impact. A boat constructed of ferro-cement continues to gain strength for a number of years after construction. Ferro-cement, a relatively lightweight material, is lighter than steel. The low thermal and sound conductivity of ferro-cement make it a good material for hull construction. It is easily repaired and is reported to be the only material for boat building that can be easily and permanently repaired under water. Because of the method of construction, tanks and other components may be integrally molded onto the hull.

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passive tank system involves two tanks spaced as far apart as possible, preferably amidships and preferably high above the rolling axis. The tanks, which are connected by an open duct, are filled with liquid (usually sea water) to a predetermined level. A righting effect is exerted because as the vessel rolls, the motion of the water in the tanks lags behind the motion of the vessel.

Damping of the water flow by proper design of the connecting duct is a refinement of the basic system. Damping the water flow produces less reduction in maximum roll angles, whereas it reduces the motion at periods above and below the natural period. A further refinement of the system involves the use of valves in the duct; the valves are hydraulically controlled by signals from a gyroscope. Although this system is expensive, it is capable of superior roll damping.

The most sophisticated liquid damping system is an active one that uses valves and an impeller in the duct and thus does not depend on the motion of the ship to move the water in the tanks. Theoretically this system is the most effective and versatile of the liquid mass-transfer systems.

2.117

preservative. On the other hand, the porosity of the red oaks make them more susceptible to waterlogging.

The term "dry rot" is not applicable to the condition affecting boats; no decay of wood can occur if the wood is properly kept in a dry condition. Fungi are unable to produce their own sugars by using the energy of sunlight, so they liberate sugars from wood by producing substances that dissolve the wood. This process weakens the structure of the wood. Fungus must have an adequate supply of moisture, a suitable temperature, and a supply of oxygen to grow in wood.

The correct use of oak in boat building is discussed, including methods and materials to be used for proper treatment of the wood, means of selecting the wood to use, and how to properly care for the wood during construction. A chemical test to separate white oak from red oak is given.

The author summarizes his recommendations and observations as follows: (1) under average conditions, white oak is to be preferred over red; (2) pressure-treated red oak will give service at least equal to that of white oak; (3) sapwood should be avoided; (4) wood showing any sign of decay should not be used; (5) the wood should be thoroughly dry before using sealer paints, a process that may take months if air drying is used; (6) the inside of the hull must be well ventilated; (7) fungicidal mastics must be used during construction; (8) all cut surfaces and drilled holes must be liberally protected with preservative; and (9) the bending properties of red and white oak are very similar and there is no evidence to show that pressure treatment impairs the bending properties of red oak.

2.117 QUESTION AND ANSWER ON: CATAMARANS

Anonymous
World Fishing 15, No. 12, 30-32 (December 1966)

The double-hulled catamaran is an extremely stable boat. A conventional craft rolls as it tries to stay vertical to the changing wave slope of the water. Owing to over-correction of the steering, a "pendulum" effect can occur with a single-hull boat if the rolling period approaches the natural period of the boat. This effect is not likely to happen with a catamaran because the lower center of gravity and the damping effect of the twin hulls do not result in a critical period to cause pendulum action. The hulls will lift alternately in small waves square on the beam; one hull will damp the other as soon as the sea begins to quarter. Heavy pitching in head seas is prevented by the light weight and high buoyancy. The possibility of a power catamaran overturning is negligible.

The catamaran is a high-speed boat, designed to be used with a high-speed engine. A single, heavy, low-speed engine would not be a good choice for one of these boats because it would have to be placed amidships on deck and it would require a larger diameter propeller than the low draft of the boat would allow. There are several possibilities for placing an engine or engines, such as an inboard/outboard engine in each hull or an inboard engine driving through long skegs in each hull. Catamarans are best suited for applications in which saving
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 ABSTRACTER: E. R. Weissman

2.6 U.K. [UNITED KINGDOM]: CONSISTENT QUALITY AND AGGRESSIVE SELLING ARE KEYS TO MARKETING SUCCESS

Campleman, G. (White Fish Authority Fishery Economics Research Unit, Hull, England)
World Fishing 16, No. 1, 19-21, 35 (January 1967)

The distribution and retailing of foodstuffs in Britain have undergone significant changes during the past 20 years. New forms of wholesaler-retailer cooperation have come into being, and a wide range of foodstuffs is being offered for sale in new types of shops. Packaging and presentation of foodstuffs have improved; commodities such as quick-frozen fish, which were nonexistent 20 years ago, are now available. These changes have affected the marketing of foodstuffs.

Almost all fish in the United Kingdom are first offered for sale at auctions on the coast. This practice does not conform to developments in the marketing of other types of foodstuffs, but it has continued because of the nature of the fishing industry and of fish. The fishing industry is subject to considerable day-to-day fluctuations in supplies, in quality and size of the product, and in demand. The extreme perishability of fish makes stock holding expensive.

The major trend in recent years has been the integration and reduction in the number of coastal wholesalers. The reasons for this trend include the development of filleting-processing machinery, a shortage of skilled labor at all stages
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 ABSTRACTER: E. R. Weissman

2.12 HOW DO THE VARIOUS FISH BEHAVE AHEAD OF AN OTTER TRAWL?

Anonymous
Canadian Fisherman 54, No. 2, 30 (February 1967)

The Fisheries Research Board of Canada St. Andrews Biological Station used a multiexposure underwater camera and electronic flash unit to record the behavior of fish ahead of an otter trawl. Knowledge of fish behavior ahead of an otter trawl is essential for the design of more efficient fish gear and will assist engineers in making changes in gear necessary to improve catches.

The camera and flash unit were housed in an aluminum case designed to reduce distortion and the case was attached to the headrope and square of the trawl. The camera took pictures of a 15-square-foot area of the bottom immediately ahead of the footrope. Pictures were taken at 12-second intervals and about 300 pictures were taken during a 1-hour tow. A total of about 10,000 pictures were taken. Each picture included a record of time, depth, area, and frame number. Photographs were taken on about 40 tows; little more than half of these tows were made during the day.

The most abundant fish in the photographs were cod; haddock, flatfish (winter flounders and American plaice), skate, long-horn sculpin, and eelpout also appeared in the pictures. In general, fish ahead of the footrope swam near the bottom. They made no attempt to escape over the headrope. During daylight hours the cod
(over)

 ABSTRACTER: E. R. Weissman

2.6 (*) BIG FUTURE FOR PREPACKAGED WET FISH -- HIGH QUALITY IS PARAMOUNT

Anonymous
Food Manufacture 42, No. 1, 17-18 (January 1967)

After tests had been conducted in British stores with prepackaged wet fish to determine consumer reaction and to resolve technical problems of production, distribution, and retailing, a code of practice was formulated to ensure successful exploitation of this new method of fish distribution.

The recommended code of practice would include the following:

1. Raw material must be of consistently high quality.
2. Shelf life must be clearly stated and known by persons involved in the distribution chain.
3. Taste panels should be used to ascertain if a product is of a predetermined quality standard.
4. The producer must know of conditions in the distribution chain and impose a limit on the shelf life to maintain quality control.
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*Item on back of card.

 ABSTRACTER: M. M. Gwin

ADVANTAGES OF CATAMARANS

PHOTOGRAPHING FISH BEHAVIOR

BRITISH FISH MARKETING

MARKETING PACKAGED FISH

swam ahead of the net in the same direction of the tow until they tired and drifted back into the net. Fewer cod were photographed during tows at night. Groupings of cod were less frequent at night, and the cod swam less frequently in the direction of the tow. A large percentage of the fish photographed were headed toward the wings of the net or toward the mouth of the trawl. The lack of uniformity in response of cod to the net may be related to vision. The cod were more inclined to swim in any direction at night; apparently they can see better during the day.

Of the few haddock photographed, the majority appeared to swim in the direction of the tow, both during the day and at night. The flatfish were usually observed heading for the wings no matter when they were photographed. Laboratory tests suggest that flatfish and other of species of fish can escape from any position between the wings of an otter trawl towed at 3 knots if they can obtain the right combination of swimming speed and direction. The long-horn sculpins and eelpout appeared to be resting on the bottom, rather than swimming away from the gear. The skates swam ahead of the net, but they did not appear to follow any particular pattern.

More information is needed about the behavior of fish along the entire mouth of the trawl and as far ahead as the otter doors. The problem of suspending cameras between the otter doors so that they will photograph the bottom is now being considered.

5. The fish for prepackaging should be iced fish and thawed sea-frozen fish that have been kept at -20° F. for less than 3 months.

6. During transport and display, the product must be kept between 32° and 38° F.

7. Regulations applying to vehicles, holding rooms, and display cabinets must be strictly adhered to.

8. Knowledge, speed, and care must be used in handling the product.

(Abstract of this article appears under 1.0158 page 3 - February 1967)

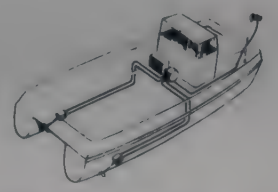
Ubaidillah, Tengku
Current Affairs Bulletin, Indo-Pacific Fisheries Council 44, 1-5 (December 1965)

time getting to and from fishing grounds is important. For this purpose, small, high-speed engines would be a good choice because they offer the advantages of reliability, high power-to-weight ratio, wide range of speed, low initial cost, and easy service exchange at overhaul time.

One advantage offered by this type of hull is a large deck area, which offers possibilities for increased accommodations, a larger wheelhouse, stowage on deck, and additional room to work if the boat is equipped with an offset wheelhouse. There is greater flexibility in the placing of heavy deck gear on a catamaran than on a conventional boat because the stability is greater on a catamaran.

The catamaran hull is extremely strong for a boat 20 to 50 feet in length. The existing catamarans are of fiberglass construction, and the fiberglass should stand up under hard fishing conditions. Fiberglass construction is easily and quickly repaired with resin and glass fiber.

Conventional hull is subject to pendulum action. Split buoyancy gives better roll recovery.



Engine-driven hydraulic pump powers twin hydraulic motors and hydraulic pot-hauler.

 (Cross Reference: 1.0146)

of distribution, changes in retail shopping habits, and the advantages in marketing and promotion enjoyed by large firms.

Fish frozen at sea comprised about 8 percent of the total distant-water landings in 1965 and are expected to make up 15-20 percent of the total by 1970. At present, sea-frozen fish usually bypass normal coastal wholesaler channels and a are distributed by large, integrated concerns or are sold on contract to other large processors.

An increased consumer preference has resulted in a significant increase both in the quantity retailed and in the share of the total retail market taken by quick-frozen fish. It is expected that sales of quick-frozen fish will increase about 47 percent by 1975. This trend also favors the large, integrated concern.

The retail marketing of wet fish presents problems of preparation, waste disposal, and cold storage, which make this product unattractive to supermarket operators. The traditional type of fish monger is also facing economic and labor problems. There is a demand for wet fish of good and reliable quality, offered in appropriate consumer packaging with a minimum of preparation, storage and wastage. The major problem in this area has been the development of a satisfactory wrapping material. It is expected that once this problem is overcome, a large-scale, integrated marketing operation will develop for wet fish carrying a brand name.

2.9 (*) ON THE MECHANISM OF RED TIDE OF TRICHODESMIUM IN RECIFE NORTHEASTERN BRAZIL, WITH SOME CONSIDERATIONS OF THE RELATION TO THE HUMAN DISEASE, "TAMANDARÉ FEVER"

Satô, Shigekatsu, Maryse Nogueira Paranaguá, and Enide Eskinazi
Trabalhos do Instituto Oceanográfico da Universidade do Recife, pp. 7-49 (1966) (Recife, Brazil) (In Portuguese, English summary)

A species of blue-green algae, Trichodesmium erythraeum, was found in the coastal waters off northeastern Brazil during October and November 1963. Three types of algal colonies were found, each having a different proportion of dark- and light-colored cells. Samples were examined and were presented along with the results of planktonic and hydrographic surveys from the previous years. In 1962, the standing crop of diatoms was poor and the maximum crop occurred in October. In 1963, diatoms increased only slightly in October and then decreased shortly after the first appearance of Trichodesmium. Trichodesmium was very abundant in net-hauled samples, with a maximum of 2,580,000 cells per liter; the alga was most abundant in the waters enclosed by reefs.

The authors hypothesized that this species of alga may grow most abundantly in high-temperature and high-salinity conditions, which are not suitable for diatom production. The authors also speculated that the red tide of the Trichodesmium may have resulted in a poor catch for cast net fishermen near shore. The
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*Item on back of card.

 ABSTRACTER: M. M. Gwin

3.30 CANNING AND STORAGE OF CRABMEAT

Gangal, Sharad, and N. G. Magar (Department of Biochemistry, Institute of Science, Bombay 1, India)
Food Technology 21, No. 3A, 79A-82A (March 30, 1967)

Canned crabmeat is susceptible to changes in both color and flavor during storage. These changes are mainly due to the breakdown of proteins under the influence of heat. Ammonia and volatile sulfur compounds are liberated in the meat during canning and tend to react with copper and iron in the meat to produce blue or black discoloration. Also, the care with which the raw product is handled affects the flavor of the canned product. The present article reports on the effect on crabmeat of canning and storage, with and without antioxidants, and on the nutritive value of the canned product.

If the pH value of the crab is held below 7, the authors report that discoloration is prevented. A number of buffers have been tried, including various mixtures of sodium hydroxide-citric acid, or sodium hydroxide-tartaric acid; sodium phosphate; a combination of lactic acid, alumina, and zinc salts; lemon juice; citric acid; vinegar; sodium citrate; and ethylenediaminetetraacetate with alum. Many of these agents also affect the flavor of the crabmeat in an adverse way and are ineffective in preventing spoilage due to lipid oxidation. Citric acid was found not only to retard discoloration but to impart the least adverse flavor to the meat. A combination of citric acid and nordihydroguaiaretic acid (NDGA) effectively preserved the typical crabmeat flavor.
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 ABSTRACTER: E. R. Weissman

3.15 CHANGES IN THE MICROFLORA OF IRRADIATED PETRALE SOLE (EOPSETTA JORDANI) FILLETS STORED AEROBICALLY AT 0.5 C

Pelroy, Gretchen A., John P. Seman, Jr., and Melvin W. Eklund (Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington)
Applied Microbiology 15, No. 1, 92-96 (January 1967)

Some groups of organisms present on fish are more susceptible to radiation than are others, so irradiation causes a qualitative change in the microflora of the fish. The conditions under which the fish are stored after irradiation also have an effect on the composition of the microbial population. In the present study, irradiated petrale sole (Eopsetta jordani) were stored under aerobic conditions to compare the changes in the spoilage flora with changes that occur in the spoilage flora of irradiated petrale sole stored anaerobically.

Irradiation at 0.4 Mrad reduced the initial bacterial population from 1.8×10^5 to 3.2×10^2 per gram, and the yeast population from 1.7×10^2 to less than 5.0×10^1 per gram. The original bacterial population was composed, in order of predominance, of coryneforms, Achromobacter, Micrococcus, Flavobacterium, Pseudomonas, and Lactobacillus. Candida, Trichosporon, and Torulopsis made up the yeast population. After irradiation, Achromobacter, Micrococcus, and coryneforms comprised most of the bacterial population. The Pseudomonas were extremely sensitive to low doses of radiation, though a few did survive 0.1 Mrad. Only a single colony of Candida was found immediately after irradiation, although yeast cells are generally more resistant to radiation than are bacteria.
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 ABSTRACTER: E. R. Weissman

4.11 METHODS OF ISOLATION AND IDENTIFICATION OF VOLATILE COMPOUNDS IN LIPIDS

Angelini, Pio, D. A. Forss, M. L. Bazinet, and Charles Merritt, Jr. (Pioneering Research Division, U.S. Army Natick Laboratories, Natick, Massachusetts)
Journal of the American Oil Chemists' Society 44, No. 1, 26-29 (January 1967)

High-vacuum degassing procedures avoid many of the problems inherent in the isolation of volatile constituents from fats, but these procedures are not suitable for the recovery of the more volatile compounds. A headspace and low-temperature, high-vacuum sampling procedure was used to study the volatiles produced by irradiation and autoxidation of butterfat. This procedure was designed to prevent the loss of volatiles produced by treatment, to avoid artifacts, and to use gas chromatography and mass spectrometry for analyses.

The detection and identification of the components of complex mixtures, such as butterfat volatiles, depend upon the effectiveness of the gas chromatographic separation achieved. For example, the mass spectra of n-pentane and isopentane have identical mass peaks, and only the ratios of peak intensities are different. In this case, subambient temperature-programmed gas chromatography is invaluable in separating a mixture of n-pentane and isopentane. The necessity of effective gas chromatographic separation is shown by the mass spectra that appear above the respective chromatographic peaks. Isopentane can be positively identified as the first peaks eluted and n-pentane identified as the second peaks eluted.
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 ABSTRACTER: M. F. Tripple

OCCURRENCE OF RED TIDE IN BRAZIL

CHANGES IN IRRADIATED FISH MICROFLORA

SPOILAGE OF CANNED CRABMEAT

IDENTIFICATION OF VOLATILE COMPOUNDS IN LIPIDS

3.15

Both irradiated and nonirradiated samples of fish were stored at 0.5° C. The predominant bacteria in the nonirradiated samples at the end of the storage period were Achromobacter and Pseudomonas. These bacteria have been considered to be the major cause of spoilage of unprocessed, refrigerated fishery products. A few enteric bacteria were also found on the nonirradiated samples; none were found on the irradiated samples. Achromobacter predominated in the irradiated samples. A few Pseudomonas were found in samples irradiated with up to 0.3 Mrad.

Trichosporon yeast cells were the most common isolates in this study. At the time of spoilage of nonirradiated samples, this species comprised 74 percent and Candida comprised 21 percent of all yeast cells. In the samples irradiated with 0.4 Mrad, Trichosporon comprised 97 percent of the yeast cells at the time of spoilage. In these samples, more yeast than bacteria were found throughout the entire storage period.

Since the microflora in irradiated fillets stored under vacuum, was almost entirely Lactobacillus, the authors concluded that storage atmosphere is an important factor in determining what the predominating microflora will be at the time of spoilage of irradiated fish.

4.11

The principal components of butterfat are aliphatic hydrocarbons and large peaks that correspond to an homologous series of unseparated alkanes and alk-1-enes. These compounds are easily identified by their mass spectra. The small peaks preceding each of the larger peaks correspond to an homologous series of iso-, or 2-methyl alkanes. If these alkanes are not separated from the corresponding normal alkanes, their presence in trace amounts would not be noticed.

The reaction flask used in this experiment provided a container that was inert, prevented loss of any volatiles produced, and allowed a wide variety of treatments of the sample in any atmosphere desired. The high-vacuum distillation of volatiles worked well for low and moderately high boiling compounds, but the procedure lost efficiency for recovering very high boiling compounds. The low-temperature and high-vacuum conditions used during the collection minimized both chemical alteration of the compound and production of artifacts.

The method used for sample division proved to be very efficient. Equal splitting of a sample depended on the symmetry of the apparatus. Paired parts of the apparatus must be well matched, openings must be aligned, and any blockage must be avoided.

Some of the samples could not be completely separated by wide-range temperature-programmed gas chromatography because of high complexity and wide variation in amounts of volatiles present. The compounds, however, were usually well enough separated to allow identification by rapid-scanning mass spectometry. These techniques were used successfully to recover and analyze the volatiles produced by irradiation and autoxidation of butterfat. [23 references]

2.9

human disease, "Tamandaré fever" is attributed to Trichodesmium because it is derived from the water nuclei or aerosols containing fragments or contents of Trichodesmium. The disease has been observed almost annually in February or March in Tamandaré Bay, and it may have occurred throughout the northeastern coast of Brazil.

Russell, Findlay E. (Loma Linda Univ., Los Angeles, California)
Chemical Abstracts 65, 5935b (August 15, 1966)

3.30

The meat of Scylla serrata was packed three different ways: in brine, in brine plus citric acid plus NDGA, and in brine after a dip in citric acid. The citric acid dip appeared to have the most adverse effect on flavor and nutritive value. Analysis of the meat immediately after it was canned showed that the moisture content had dropped slightly and that nonprotein nitrogen and water-soluble vitamins and minerals were decreased by the leaching of the meat during cooking and rinsing.

Samples of the canned meat were stored at room temperature (28°-30° C.) and at 37° C. Under both conditions, the B vitamins and amino acids greatly decreased during storage. In contrast, the nonprotein nitrogen, trimethylamine nitrogen, total volatile basic nitrogen, and pH all increased steadily during the same time.

The fat of the canned crabmeat showed a markedly increased peroxide value and a markedly decreased iodine value during the 9 months' storage, indicating that the long unsaturated fatty acids broke down during storage. The authors found that the antioxidants tested in this study not only minimized the changes in the peroxide and iodine values but helped to preserve the characteristic taste of the crabmeat as well.

4.13 THE STEROLS OF SEAFOOD

Kritchevsky, David, Shirley A. Tepper, Nicholas W. DiTullo, and William L. Holmes (The Wistar Institute of Anatomy and Biology, and Smith, Kline, and French Laboratories, Philadelphia, Pennsylvania 19104)
Journal of Food Science 32, No. 1, 64-66 (January-February 1967)

Knowledge of the sterol content, especially the cholesterol content, of seafood is important in determining the role of seafood in low-cholesterol diets. Since the available literature contains conflicting values for the cholesterol content of shellfish, the authors present their data on the percentage of cholesterol existing in the nonsaponifiable fraction of various fish.

Sterol content was analyzed by gas-liquid chromatography; peaks were identified by comparing their retention times with those of cholesterol. Oyster, clam, scallop, and crab were found to contain large amounts of sterols other than cholesterol, although cholesterol remained the largest single sterol component. Haddock, pollock, salmon, shrimp, and lobster all had a cholesterol content of over 90 percent of the nonsaponifiable fraction (93.1, 94.1, 96.1, 95.6, and 99.2 percent, respectively).

Other sterols found in the various species examined were squalene, C_{26} sterol, 22-dehydrocholesterol, brassicasterol, 24-methylene cholesterol, and C_{29} sterols. The retention times of brassicasterol and desmosterol are identical to
(over)

 ABSTRACTER: E. R. Weissman

4.19 SEED LIPIDS
(*)

Wolff, Ivan A. (Northern Utilization Research and Development Division, U.S. Department of Agriculture, Peoria, Illinois 61604)
Science 154, No. 3753, 1140-1149 (December 2, 1966)

Many of the recently discovered seed-oil acids have reactive or unusual functional groups or other aspects of molecular structure that permit their ready differentiation from oleic, linoleic, linolenic, and the other most prevalent saturated and unsaturated long-chain fatty acids. The recognition and availability of the new acids, along with methods to make detection and determination easy, will aid studies of lipid biosynthesis in plants and studies of lipid metabolism and utilization in animals, and will stimulate in-depth studies on the fine points of seed-lipid structure. Correlating the structural patterns in seed lipids of particular groups of plants with classical taxonomic categories will permit clarifications, assist in classifications, and accelerate research in chemotaxonomy and phylogenetics. Seed lipids are well suited for establishing relations among plants because of their great variety in structure as compared with the more limited structural types of amino acids, sugars, purines, and other plant substances. The newly characterized seed oils are also potentially important raw materials for industry if they come from agronomically promising plant species.

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 ABSTRACTER: M. F. Tripple

4.21 AUTOXIDATION OF METHYL LINOLEATE
(*) IN FREEZE-DRIED MODEL SYSTEMS.
I - EFFECT OF WATER ON THE AUTOCATALYZED OXIDATION

Maloney, John F., Theodore P. Labuza, David H. Wallace, and Marcus Karel (Departmet of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge 02139)
Journal of Food Science 31, No. 6, 878-884 (November-December 1966)

The oxidation of methyl linoleate was studied in a model freeze-dried system, which used microcrystalline cellulose. The samples of methyl linoleate were adjusted to various water activities ranging from about 0 to about 0.6. Oxidation was followed manometrically. As determined from the induction period and rate data, water was found to have an inhibitory effect on the oxidation reaction. This effect varied with water activity up to values of 0.5. Evaluation of the rate data indicated that the inhibitory effect of water was strongest in the initial stages of oxidation, including the period during which hydroperoxide decomposition follows monomolecular decomposition kinetics. Possible interpretations of the observed water effect and its significance to the problem of lipid oxidation in dehydrated foods are discussed. [19 references]

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 ABSTRACTER: M. M. Gwin

4.21 AUTOXIDATION OF METHYL LINOLEATE
(*) IN FREEZE-DRIED MODEL SYSTEMS.
III - EFFECTS OF ADDED AMINO ACIDS

Karel, Marcus, Steven R. Tannenbaum, David H. Wallace, and Honore Maloney (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge 02139)
Journal of Food Science 31, No. 6, 892-896 (November-December 1966)

The oxidation of methyl linoleate in the model system was studied in the presence and absence of added amino acids. The concentrations of amino acids ranged from 10^{-4} to 10^{-2} moles of additive per mole of linoleate. All experiments were conducted in model freeze-dried systems without water. The oxidation was followed by manometric measurements and by determination of diene conjugation. Parallel experiments were conducted on the same systems with the addition of conventional antioxidants, including propyl gallate. Certain of the amino acids, including histidine, ß-amino-butyric acid, lysine, and cysteine showed substantial antioxidant activity. The nature of the antioxidant activity was different from the activity seen with propyl gallate, because the main effect of the amino compounds was to prolong the induction period and to affect the initial rate of oxidation. The amino acids had no effect in the more rapid, bimolecular phase of oxidation. Propyl gallate, however, also had an inhibitory effect in the bimolecular stage. This report discusses kinetic interpretation of the data and the significance of the findings to stability problems in dehydrated foods. [11 references]

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 ABSTRACTER: M. M. Gwin

STEROLS IN SEAFOOD

SEED TRIGLYCERIDE OILS

EFFECT OF WATER ON AUTOCATALYZED OXIDATION

EFFECT OF AMINO ACIDS ON AUTOXIDATION

4.19

Because the molecular structures of seed triglycerides have an influence on their physical properties, advances in knowledge of this subject have practical implications. The unusual characteristics of cocoa butter that make it so valuable for food and confectionary use are attributed to the specific arrangement of fatty acids in its triglycerides. The glycerides are almost all 2-oleic-1,3-disaturated acid triglycerides. The physical characteristics of lard are advantageously changed by catalytically rearranging fatty acyl groups among the glycerides initially present to achieve a more random distribution. This procedure is sometimes followed by further fractionation to remove more saturated glycerides. The change of glyceride structures gives a preferred, less grainy texture. Future studies to understand and control seed-oil triglyceride structures will be significant in developing margarines of improved texture and "feel," cocoa-butter substitutes, and many other products.

The author anticipates a continuation of rapid, fruitful progress in seed-lipid research and utilization. Any progress will be helped by the investigation of seed lipids from a large number and variety of different plants in order to find new types of fatty acids, new sources of familiar oils, and to obtain more data regarding glyceride structures. [86 references]

Itazaka, Osamu, Taro Hori, Hideo Inoue, and Kimiko Mesuda
Chemical Abstracts 65, 5734e (August 15, 1966)

BIOCHEMISTRY OF SHELLFISH LIPID. VII - GAS CHROMATOGRAPHIC DETERMINATION OF THE NEUTRAL SUGAR CONSTITUTION OF CORBICULA GLYCOLIPID

4.19

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those of cholesterol. (Thin-layer chromatography was used to determine that brassicasterol was the sterol present in the tissue under examination.)

The authors report that their findings and the results given by other investigators, with the exception of Thompson (1964), agree fairly well. Thompson used chloroform-methanol 1:2 and a 30-second extraction period to extract the sterols from the tissue. The present authors believe such a short extraction period will leave most of the sterol in the tissue residue. In the present study, extraction was carried out in chloroform-methanol 2:1 for 6 hr. Even, so, the authors believe that not all the sterol was extracted.

The authors attribute some of the variations in published data to a combination of seasonal variations, species differences, and analytical techniques--the color yield of the several sterols varies when a cholesterol standard is used. The actual weight of the nonsaponifiable material may be considerably different from that indicated by extraction and colorimetric analysis.

The investigators note that, although a number of seafoods contain a variety of sterols other than cholesterol, these seafoods are not desirable additions to a low-cholesterol diet, inasmuch as dihydrocholesterol, dehydrocholesterol lathosterol, soy sterols, and desmosterol are known to be atherogenic.

BIOCHEMISTRY OF SHELLFISH LIPID

4.21 EFFECT OF α-TOCOPHEROL UPON LIPID PEROXIDATION AND DRUG METABOLISM IN HEPATIC MICROSOMES

Gram, Theodore E., and James R. Fouts
Archives of Biochemistry and Biophysics 114, 331-335 (May 1966)

In an in vitro system consisting of a 9,000-gram supernatant fraction of rat liver and a system that generated the reduced triphosphopyridine nucleotide, lipid peroxidation was significant during incubation at 37° C.; with rabbit liver it was negligible. With rat liver, adding hexobarbital or codeine to the system slightly stimulated peroxidation, but adding aminopyrine, zoxazolamine, aniline, or 3,4-benzpyrene reduced or ended it. Homogenizing the liver in the presence of α-tocopherol ended lipid peroxidation when the homogenate was later incubated with or without hexobarbital or codeine. When the homogenate was incubated with the supernatant fraction of rat liver, hexobarbital and codeine were metabolized linearly with time for relatively short periods. Early plateaus in activity suggested enzymic inactivation. Although α-tocopherol stopped lipid peroxidation, it had no effect on the time course curves of either hexobarbital or codeine metabolism, suggesting that peroxidation is not the cause of the inactivation of microsomal drug-metabolizing enzymes in rat liver. [Abstracter: L. Baldwin]

LIPID PEROXIDATION AND DRUG METABOLISM

4.21 AUTOXIDATION OF METHYL LINOLEATE IN FREEZE-DRIED MODEL SYSTEMS. II - EFFECT OF WATER ON COBALT-CATALYZED OXIDATION

Labuza, Theodore P., John F. Maloney, and Marcus Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge 02139)
Journal of Food Science 31, No. 6, 885-891 (November-December 1966)

Oxidation of methyl linoleate that was catalyzed by various salts of cobalt was studied in a model system, which used microcrystalline cellulose. The model freeze-dried system was adjusted to various water activities. Manometric measurements and measurements of diene conjugation were used to determine the effect of water on the oxidation kinetics. Water was found to have an inhibitory effect on the metal-catalyzed oxidation of the fatty ester and on oxidation in the absence of added metals. Kinetics of the reactions were evaluated in terms of the hydroperoxide decomposition mechanism, which was established in the first part of this study. The effect of water on the metal-catalyzed oxidation was found in the monomolecular decomposition period and in the more rapid phase of the reaction, during which hydroperoxide decomposition is known to follow bimolecular decomposition kinetics. The inhibition of the reaction by water was due to deactivation of added- and native-metal catalysts by hydration of the coordination shells. Inhibition was also possibly due to hydrogen bonding between hydroperoxides and water, and to interference with the normal bimolecular decomposition reaction.
[8 references]

EFFECT OF WATER ON COBALT-CATALYZED OXIDATION

4.29 METABOLISM OF ALPHA-ALKOXY GLYCERYL MONOETHERS IN RAT LIVER, IN VIVO AND IN VITRO

Snyder, Fred, and Ramond C. Pfleger (Medical Division, Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee)
Lipids 1, No. 5, 328-334 (September 1966)

The α-alkoxy glyceryl monoethers occur in nature as free ethers, fatty acid esters, and phospholipids. Although their distribution in mammalian tissues has been reported, the origin and metabolic significance of these monoethers in mammalian cells are unknown. The ^{14}C- and ^{3}H-labeled α-isomers of C_{16} and C_{18} alkoxy monoethers were administered intravenously to rats and added to slices of rat liver. The tissue distribution and metabolic products that followed this treatment are reported. The metabolic transformations of glyceryl monoethers in liver, bone marrow, and spleen of rats were studied in vitro.

In the rat liver, extensive cleavage of the ether bond occurred. About 99 percent cleavage of the $C_{16:0}$ ether bond and about 94 percent cleavage of the $C_{18:0}$ ether bond occurred in the liver within 6 hours after the intravenous injection. When chimyl alcohol labeled with both ^{3}H and ^{14}C was injected, acetylation and subsequent acetolysis showed that less than 0.92 percent of the phosphatides and less than 1.52 percent of total lipid radioactivity were in the form of alkoxy ethers. Long-chain fatty alcohols and fatty acids were the main

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 ABSTRACTER: M. F. Tripple

4.4 (*) DIGESTION OF TRIGLYCERIDES BY LOBSTER

Brockerhoff, H., J. E. Stewart, and W. Tacreiter (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Canadian Journal of Biochemistry 45, No. 3, 421-422 (March 1967)

Triglycerides in mammals are digested by pancreatic lipase to a mixture of diglycerides, monoglycerides, and fatty acids. The lipase specifically attacks the primary ester bonds of glycerides. Breakdown products are α,β-diglycerides followed by β-monoglycerides. The same specificity is shown by the pancreatic lipase of a skate and by the digestive lipase of cod. A similar action by the lipase of a lobster (Homarus americanus) is reported.

Four milliliters of gastric juice at pH 4.7 from the lobster was shaken with 0.1 g. of triolein at room temperature for 55 min. One ml. of acetic acid was added, and the lipids were extracted with hexane. Gastric juice without triolein was treated in the same way. The lipids were chromatographed on a thin-layer plate of 10 × 20 centimeters, which was prepared from 12.5 g. of silica gel G and 20 ml. of 3 percent aqueous boric acid solution. Partially hydrolyzed corn oil was used for comparative identifications. Fatty acids, diglycerides, and monoglycerides were formed. The predominant diglyceride was the α,β-isomer. The predominant monoglyceride was the β-isomer.

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 ABSTRACTER: M. M. Gwin

4.91 EFFECT OF ω3 FATTY ACIDS ON THE GROWTH RATE OF RAINBOW TROUT, SALMO GAIRDNERII

Lee, D. J., J. N. Roehm, T. C. Yu, and R. O. Sinnhuber (Department of Food Science and Technology, Oregon State University, Corvallis)
Journal of Nutrition 92, No. 1, 93-98 (May 1967)

Much work has been done on the effect of fatty acids in the mammalian diet. It is now well known that fatty acids of the ω6 configuration, linoleic and arachidonic acid, are dietary essentials for mammals. Less is known about the lipid requirements of fish, although there are some indications that the requirements of fish are different from those of mammals. The lipid composition of fish and mammals differs, with fish having more unsaturated fatty acids of longer average chain length than mammals; fatty acids of the linolenic type predominate in fish, rather than those of linoleic type, as in mammals.

In previous experiments, the authors noted that trout fed on a diet containing corn oil as the sole lipid source did not grow as fast as trout fed on the same diet containing marine oil as the lipid source. Furthermore, the trout fed on the corn oil diet had a high mortality rate, with no well-defined physiological or histological lesions. The present study was undertaken to examine the effect of ω3 fatty acids on the growth and development of fingerling rainbow trout (Salmo gairdneri).

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 ABSTRACTER: E. R. Weissman

6.197 THE ZINC AND MANGANESE CONTENTS OF SOME BRITISH POULTRY FOODS

Dewar, W. A. (Agricultural Research Council Poultry Research Center, Edinburgh, Scotland)
Journal of the Science of Food and Agriculture 18, No. 2, 68-71 (February 1967)

The contents of zinc and manganese in poultry foods used in the United Kingdom were surveyed. Food samples were ashed, manganese contents were determined by the periodate oxidation method for biological material, and zinc contents were determined by the mixed color dithizone method.

Results are expressed as milligrams of zinc and manganese per kilogram of dry matter. The author calls attention to the fact that other authors have expressed the results of similar experiments in terms of milligrams of zinc and manganese per kilogram of food, so that direct comparison of their results with the present paper is not possible. A content of 15 mg. of zinc per kg. of dry matter was considered low and more than 40 mg. of zinc per kg. of dry matter was considered high. The corresponding values for manganese were 35 mg. per kg. of dry matter and 60 mg. per kg.

It was found that most of the cereal grains were fairly good sources of zinc; barley, maize, and wheat were poor sources of manganese. Foods of animal origin were generally poor sources of manganese and good sources of zinc. Crab meal was a relatively good source of manganese.

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 ABSTRACTER: E. R. Weissman

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The digestive lipase of the lobster acts on triglycerides in the same manner as the corresponding enzymes of mammals and fish. This specificity for α-bound esters may be typical for all digestive lipases of animals, in contrast to the action of mobilizing enzymes, lipoprotein lipase, or the lipases of plants, in which no such specificity has been demonstrated.

4.4 CHANGES OF OIL IN DRIED MUSCLE.
I - THE EFFECT OF PACKING ON THE CHANGES OF OIL

Oyama, Shigenobu (Univ. of Kagoshima, Japan)
Chemical Abstracts 61, 1178c (July 6, 1964)

4.4 DETERIORATION OF UNSATURATED FATTY ACIDS
ON THIN-LAYER PLATES

Imaichi, Kunitaro, Junichi Fukuda, and Akimitsu Notomi (Fujikoshi Hoso., Toyama, Japan)
Chemical Abstracts 64, 17876h (June 6, 1966)

6.197

There are two limitations on the usefulness of information contained in the article for formulating a practical poultry diet. First, considerable variation in zinc and manganese contents was found between different samples of the same kind of food, making prediction impossible. Second, the results express the total zinc and manganese contents of the various foods, not the nutritionally available contents. [18 references]

4.29

products of ether cleavage in the liver. The relative rate of incorporation of ^{14}C from chimyl alcohol into triglycerides and from batyl alcohol into phospholipids showed that the palmitic acid from chimyl alcohol and the stearic acid from batyl alcohol were formed after cleavage and that they entered the free fatty acid pool.

Incubating liver slices with labeled batyl or chimyl alcohols resulted in the same products as were obtained in the in vivo experiment. Less than 1.4 percent of the C_{16} and C_{18} alkoxy ethers was oxidized to $^{14}CO_2$ during a 3-hr. incubation.

The results showed that the alkoxy ether bond is more rapidly and completely cleaved after intravenous administration of the glyceryl monoether than when they are administered orally. The cleavage produces the alcohols and acids of the hydrocarbon chain that existed in ether linkage with glycerol. Aldehydes were not detected, but such an intermediary step has been postulated in the conversion of the hydrocarbon chain of the ether to the acid. The essentially 100-percent splitting of the alkoxy ethers after their intravenous injections indicated that if the hemopoietic and radioprotective actions thought to be inherent in the α-alkoxy glyceryl ethers do exist, they probably reside with one of their metabolic products. [23 references]

4.91

Four-month-old trout, which had been raised on a diet containing 10 percent corn oil as the sole lipid source, were divided into five groups. Four of the groups (test groups) were fed experimental diets containing varying amounts of corn oil and other lipids, to make up the total 10 percent lipid diet. The fifth group (control group) was fed on the original 10 percent corn oil diet. The main difference between the control diet and the experimental diets was the increased level of ω3 fatty acids in the experimental diets fed the test groups. The sole source of ω3fatty acids in the control diet was 0.12 percent linolenic acid from the corn oil. The four experimental diets contained ω3 acid sources amounting to 0.75, 0.25, 0.73, and 1.00 percent, respectively, of the total of each diet.

The fish fed on the experimental diets that contained salmon oil, soybean oil or methyl linolenate showed significantly better feed utilization and growth rate, and much lower mortality than did the fish that were fed on the corn oil diet.

All the diets contained a much higher level of linoleic acid than does the natural trout diet and this level was reflected in the fatty acid composition of lipids from the experimental fish. The authors believe that the high level of linoleic acid has no deleterious effects on the trout so long as adequate levels of linolenic acid were maintained in the diet.

Since all the diets in this study contained ω6 fatty acids, the authors are unable to say whether these fatty acids are required by the trout as are fatty acids of the ω3 type. [15 references]

7.51 (*) DISK ELECTROPHORESIS METHOD FOR THE IDENTIFICATION OF FISH SPECIES

Thompson, R. R. (Division of Food Standards and Additives, Food and Drug Administration, Washington, D.C. 20204)
Journal of the Association of Official Analytical Chemists 50, No. 2, 282-285 (April 1967)

Since the introduction of starch-gel zone electrophoresis as a method of identifying fish species, several new supporting media such as acrylamide, agar, and cellulose acetate have been used in this method. The acrylamide procedure using the "disc" type of apparatus has been used by the U.S. Food and Drug Administration to characterize protein band patterns for identifying fish species. It has been suggested that this procedure be incorporated as an alternative method to the official, final action method of the FDA 18.047-18.049. A preliminary study made in 1964 of this method was based on instructions issued by a commercial supplier of the kits. The results submitted by several coworkers were inconclusive due to incomplete instructions and lack of experience with the disk electrophoresis apparatus.

The original procedure was clarified by the addition of detailed instructions and a second study was made. According to some of the workers, however, this technique still requires much training and practice to give satisfactory reproducible results.

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 ABSTRACTER: M. F. Tripple

7.52 QUANTITATIVE GAS CHROMATOGRAPHY OF AMINO ACIDS

Stalling, David L., George Gille, and Charles W. Gehrke (Department of Agricultural Chemistry, The University of Missouri, Columbia)
Analytical Biochemistry 18, No. 1, 118-125 (January 1967)

Quantitative analysis of amino acids by gas-liquid chromatography requires the preparation of a suitable volatile derivative of the amino acid. A number of studies have been done on various derivatives for the purpose of identification and qualitative analysis of amino acids. Very few studies have been reported on the reaction conditions necessary for quantitative conversion of amino acids to derivatives suitable for analysis and chromatography.

Some of the derivatives that have been studied are phenylthiohydantoin, methyl 2,4-dinitrophenyl esters, trimethylsilyl N-trimethylsilyl esters, the n-amyl N-acetyl esters, n-amyl N-trifluoroacetyl esters, methyl N-trifluoroacetyl esters, and n-butyl N-trifluoroacetyl esters. The n-butyl N-trifluoroacetyl esters were found to be preferable to the methyl N-trifluoroacetyl esters for quantitative analysis because no losses of the n-butyl esters occurred when the sample was concentrated. When the samples were evaporated under reduced pressure at room temperature, there was a 36-percent loss of methyl N-trifluoroacetylvaline. The conversion to the n-butyl N-trifluoroacetyl derivatives of the amino acids studied was 96 percent or higher for all protein amino acids except threonine and cystine.

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 ABSTRACTER: E. R. Weissman

7.522 GEL FILTRATION OF NUCLEIC ACIDS ON SPHERE-CONDENSED AGAROSE

Öberg, B., and L. Philipson (Division of Cell Biology, Department of Medical Microbiology, and Institute of Biochemistry, University of Uppsala, Uppsala, Sweden)
Archives of Biochemistry and Biophysics 119, Nos. 1-3, 504-509 (March 1967)

A number of methods are available for the separation of nucleic acids in which the separation is based on sedimentation rate, density, electrophoretic mobility, adsorption to various adsorbents, base ratio, specific base pairing, or selective solubility. Differences in the size of the nucleic acid molecules have also been used as a basis for separation. The various names for this technique are gel filtration, molecular sieve, restricted diffusion, and exclusion chromatography.

Soluble ribonucleic acid (RNA) has been separated from larger nucleic acids by gel filtration on dextran and polyacrylamide gels; however, these gels exclude polymers with a molecular weight of 5×10^5 or more, so they cannot be used for the separation of deoxyribonucleic acid (DNA), viral RNA, or ribosomal RNA. Granulated agar gels were found to have an exclusion limit of 2×10^5 (molecular weight); however, these gels were difficult to use because of their low flow rate. Sphere-condensed agar or agarose was introduced in place of granulated agar to overcome this problem. DNA, ribosomal RNA, and soluble RNA could be separated on sphere-condensed agarose, although the buffer composition affected the elution pattern for viral RNA.

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 ABSTRACTER: E. R. Weissman

7.53 SEPARATION OF VITAMIN K AND ASSOCIATED LIPIDS BY REVERSED-PHASE PARTITION COLUMN CHROMATOGRAPHY

Matschiner, John T., and William V. Taggart (Department of Biochemistry, St. Louis University, School of Medicine, St. Louis, Missouri)
Analytical Biochemistry 18, No. 1, 88-93 (January 1967)

Because of its capacity and ability to handle appropriate loads, column chromatography is the favored method for the preparative purification of trace neutral lipids. Adsorbants such as silicic acid or activated magnesium silicate permit class separations. Partition chromatography is valuable when used in conjunction with such adsorbants because it permits purification based on subtle structural features, such as conformation and homologous patterns.

The present article reports on the use of a reversed-phase system adapted from the paper chromatography system of Green and Dam (1954) and the partition columns of Wiss and Gloor (1958). In studies on vitamin K in beef liver, this system gave excellent separation of fat-soluble vitamins and associated lipids, and the authors believe it is a convenient method for preparative work.

Equal parts of hydrophobic diatomaceous earth and polyethylene powder comprised the column support. Varying proportions of isopropanol, acetic acid, and water equilibrated with hexane or isooctane comprised the movable solvent.

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 ABSTRACTER: E. R. Weissman

7.52

The n-butyl N-trifluoroacetyl derivatives were stable under anhydrous conditions, and single chromatographic peaks were obtained for all natural protein amino acids except arginine and tryptophan.

Although cystine, lysine, and histidine were not soluble in higher alcohols, their methyl esters readily dissolved n-butanol. The amino-acid methyl esters could be converted to n-butyl esters using anhydrous HCl as the interesterification catalyst. However, the yield of n-butyl esters from the methyl esters of threonine and cystine was less than 95 percent.

When trifluoroacetylation was done in a closed tube at 150° C. for 5 min., it was possible to obtain a single chromatographic peak for arginine and tryptophan. No adverse effects were noted when other amino acids were acylated at 150° C. This finding allowed analysis of all the amino acids as single derivatives and resulted in a significant saving of time.

The reaction conditions necessary for complete interesterification of the methyl esters of amino acids were examined as part of a continuous effort to develop a precise and accurate method for the analysis of amino acids by gas-liquid chromatography. It was found that increasing the reaction temperature from 90° to 100° C. accomplished the complete interesterification of the methyl esters to n-butyl esters and reduced by 30 min. the time required for interesterification. The concentration of the interesterification catalyst proved to be less important to the success of the process than the temperature at which the reaction took place. [12 references]

7.53

The elution of several fat-soluble vitamins was accomplished with isopropanol: acetic acid:water in a ratio of 62.5:5:32.5, in which the concentration of isopropanol was increased and the water decreased in successive runs. The same basic procedure was used to chromatograph a number of naphthoquinones.

Neighboring isoprenologs of vitamin K were separated by about three fractions; the separation varied slightly over the range of compounds. It was found that compounds differing by one double bond were separated by a little more than one fraction in their elution. Thus, phylloquinone was eluted about four fractions later than menaquinone-4 was eluted.

Ubiquinones were susceptible to chromatography by the same solvents used for the chromatography of vitamin K. Menadione and its derivatives were purified with this method by altering the isopropanol concentration in the solvent to a low level.

The reversed-phase chromatographic system described by the authors was developed for use in studies of vitamin K. The recovery of naphthoquinones and associated lipids was essentially complete. The authors believe that compared with adsorption columns, the method described in the present paper was less difficult to operate and gave no evidence of destruction or loss of chromatographed lipids.

7.51

The apparatus, reagents preparation of gel column, and method determination for the disk acrylamide gel electrophoresis method are all explained in detail.

Seven analysts were sent freeze-dried samples of perch, cod, and pollock and were asked to submit final gels showing the band patterns obtained by the acrylamide method. A developed disk for one of the samples was given each for comparison. Six of the seven coworkers had identical band patterns for each of the three samples; one of the three disks matched the comparison disk. One worker agreed on only one sample, and the disk in this case was poorly defined though readable.

Denicord tracings made from the submitted disks showed some degree of similarity when the distances between peaks were measured; however, this did not prove to be an absolute diagnostic tool. Such tracings were useful in locating faint bands that were not readily visible to the human eye.

The author recommended that the disk acrylamide gel electrophoresis method be adopted by the FDA as official.

7.51 ASTAXANTHIN ESTER AS A PROSTHETIC GROUP; A CAROTENOPROTEIN FROM THE HERMIT CRAB

Cheeseman, D. F., and J. Treble (Bedford Coll., London, England)

Chemical Abstracts 64, 18069h (June 6, 1966)

7.522

In the present study, the authors found that DNA, viral, ribosomal, and soluble RNA could be separated on sphere-condensed agarose without any significant degradation of the nucleic acids. They also found that the process was dependent on both agarose concentration and buffer composition. A concentration of agarose of less than 3 percent was necessary to separate DNA and ribosomal RNA; lower concentrations of agarose favored the separation of nucleic acids of high molecular weight. A limiting condition was the fact that, at agarose concentrations of less than 1 percent, the spheres were not rigid enough to prevent coalescence. The authors found that the elution pattern varied on gels of the same concentration, and they suggest that these gels must be standardized on the basis of their elution characteristics rather than on their agarose content.

The authors believe that the separation of nucleic acids on agarose columns depends on the size and shape of the acids. Single-stranded nucleic acids change shape in solutions of different ionic strength and at different temperatures. Thus, molecules of the same molecular weight might be separated from each other if their shapes were different or could be made different by varying the ionic strength of the buffer. For instance, a double-stranded nucleic acid would elute before a single-stranded one of the same molecular weight if a buffer of high ionic strength were used. [28 references]

7.594 THIN-LAYER CHROMATOGRAPHIC EXAMINATION OF CHOLESTEROL AUTOXIDATION

Smith, Leland L., W. Stephen Matthews, John C. Price, Richard C. Bachmann, and Brian Reynolds (Department of Biochemistry, University of Texas Medical Branch, Galveston 77550)
Journal of Chromatography 27, No. 1, 187-205 (March 1967)

The recognition and identification of the products from autoxidation of cholesterol has proved to be a difficult problem because of the tremendous complexity of the process. Furthermore, cholesterol is affected by light, heat, and other radiation in the presence of air. For these reasons, detection of the autoxidation products of cholesterol (oxidized sterols) in biological material has been viewed with suspicion, described as artifacts, or regarded as true components that were initially present in the tissue sample under investigation. Colorimetric assay or paper chromatography for the analysis of autoxidation products in sterol samples did not reveal the true complexity of the problem. The use of thin-layer chromatography (TLC) simplified the detection and identification of products of autoxidation in sterol samples. The present paper discusses the application of TLC to the study of autoxidation of cholesterol.

The authors examined some reactions of cholesterol that are known to give oxidation products. Their purpose was to determine the extent of chemical treatment possible before the occurrence of these oxidation reactions. The following

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 ABSTRACTER: E. R. Weissman

7.80 (*) DIMETHYL-ß-PROPIOTHETIN DIMETHYL SULPHIDE IN LABRADOR COD

Ackman, R. G., J. Hingley, and A. W. May (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 24, No. 2, 457-461 (February 1967)

The occurrence of the "blackberry" problem, which is a pronounced and offensive odor of dimethyl sulfide (DMS) in Labrador cod, first appeared as a large-scale problem in the fishery in 1966. It has been established that an intake of about 10 milligrams per day of dimethyl-ß-propiothetin (DMPT), the known precursor of DMS, is necessary to deposit DMPT in muscle tissues of market-size cod. Cooking experiments indicated that residual DMPT could affect the taste of cooked cod. It was considered desirable to determine DMPT levels in cod taken while feeding on Limacina helicina or related pteropods, which are the zooplankton particularly associated with the blackberry problem.

Only traces of DMS were seen in the cod flesh in contrast with higher levels of DMS seen in the stomachs and livers from the same fish. These relative levels were of only qualitative significance because storage and blending and filtering operations would lead to considerable losses of DMS. The levels of DMPT at 0.1 milligram per gram in the stomach contents of the cod were of the same order as those reported for the stomach contents (largely L. helicina) of chum salmon but

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 ABSTRACTER: M. F. Tripple

7.642 EVALUATION OF ANIMAL PROTEIN CONCENTRATES FROM THEIR AVAILABLE LYSINE CONTENT

Anwar, A. (Animal Production Department, Faculty of Agriculture, Ain-Shams University, Cairo, Egypt)
Poultry Science 46, No. 2, 309-310 (March 1967)

Comparative tests were conducted to determine which of two methods of estimating available lysine values (ALV) might be more useful in predicting the nutritive value of fish and meat meals. The fluoro 2,4-dinitrobenzene (FDNB) method of Carpenter and Ellinger (1955) and the modified method of Carpenter (1960) were used to estimate ALV. The gross protein values (GPV) of 10 samples each of fish and meat meals were determined by the techniques of Anwar (1961, 1960).

The GPV of the fish meals ranged from 78 to 120 and the GPV of meat meals from 60 to 89. The figures within each range were well distributed. The ALV calculated by the FDNB method ranged from 3.5 to 6.6, with an average of 5.5, for fish meals, and from 2.6 to 4.1, with an average of 3.6, for the meat meals. The same samples, when subjected to the modified method, gave ALV ranging from 2.6 to 6.1, with an average of 4.6, for fish meals, and from 2.1 to 4.0, with an average of 3.2, for meat meals. In all cases, the modified method yielded lower results for ALV than did the FDNB method.

(over)

 ABSTRACTER: E. R. Weissman

9.12 (*) EXPERIMENTAL STUDIES ON THE SIGNIFICANCE OF DRIFTING SEAWEEDS FOR JUVENILE FISHES. I - EXPERIMENTS WITH ARTIFICIAL DRIFTING SEAWEEDS

Senta, Tetsushi
Bulletin of the Japanese Society of Scientific Fisheries 32, 639-642 (August 1966)

Juveniles of certain species of fish gather under drifting seaweeds. The significance of drifting seaweeds for the juvenile fish was studied with artificial seaweeds.

Aggregations of juvenile fish formed under the artificial drifting seaweeds in the course of a few hours, both during the day and at night. The fish did not seem to be attracted to the drifting seaweeds by either food or the odor of the seaweed. Fishes once gathered under a mass of drifting seaweeds did not always remain, and the transfer of fish from one mass of seaweeds to another occurred repeatedly. The author felt that factors other than the reduction of light intensities may cause the gathering. [13 references]

II - Experiments on the effect of light intensity. Ibid. 643-646.--The effect of reduction in light intensity as a factor influencing the gathering of juvenile fish under drifting seaweeds was studied with a variable-light aquarium.

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 ABSTRACTER: M. F. Tripple

THIN-LAYER CHROMATOGRAPHY OF OXIDIZED CHOLESTEROL

ESTIMATING AVAILABLE LYSINE VALUES

LEVELS OF DIMETHYL SULFIDE IN COD

DRIFTING SEAWEEDS AND JUVENILE FISH

7.642

As calculated by the FDNB method, correlation coefficients of 0.986 and 0.968 for fish and meat meal, respectively, were obtained between the GPV and ALV. The modified method gave correlation coefficients of 0.934 and 0.952 for fish and meat meal, respectively, between GPV and ALV.

From these results, it would appear that despite its inaccuracy in estimating the ALV of animal protein concentrates, the FDNB method of Carpenter and Ellinger gave a better indication of the GPV of the fish and meat meals than did the modified method of Carpenter. The author concluded that the use of FDNB as a dye-absorption test could be used for estimating the protein quality of animal protein concentrates without reference to their available lysine content.

9.12

Most of the juvenile fish gathered in the light part of the aquarium, rather than in the dark part. None of the species tested gathered positively in the dark part of the aquarium. The sensitivities to changes in light intensity varied according to the fish species. Rudarius ercodes were extremely sensitive to light. It appeared that those fish living in a closer spatial relation with drifting seaweeds are less sensitive to light. Factors other than the reduction in light intensity must influence the gathering of fish under drifting seaweed and further studies into these factors are needed.

9.12 ENVIRONMENT STUDIES TO AID SPAWNING CHANNEL DESIGN

Mead, Robert
Western Fisheries 73, No. 3, 18, 20 (December 1966)

A research program is being conducted to determine the environmental factors affecting salmon survival during early stages of life. Salmon from a hatchery, spawning channel, and incubation channel, and wild salmon fry from the Pitt River, Weaver Creek, and Cultus Lake are under study to isolate differences between the wild and domestic fry that might relate to ultimate survival. Physical, physiological, and behavioral variables will be studied, with measurements made of strength, resistance to disease, evasion of predators, size of fish, and their chemical composition. The assumption is made that any differences between these parameters must be due to variation in the environment during incubation. The purpose of this research is to assist the rational design of artificial aids for the production of sockeye. The problem is considered to be particularly important in the face of environmental changes, which might result from industrialization of the Fraser River. [Abstracter: E. R. Weissman]

7.594

conditions of oxidation reaction were examined: (1) the classic method for producing "oxycholesterol" using oxidation by benzoyl peroxide in acetic acid; (2) oxidation during purification via the dibromide; (3) autoxidation of colloidally dispersed cholesterol in sodium stearate media; (4) autoxidation by heating in air; (5) autoxidation of cholesterol films by irradiating with a 254-n.m. mercury lamp; and (6) natural aging of cholesterol in contact with air. The reactions were found to occur very rapidly.

A complex, discrete pattern of oxidation products was revealed when the various products of the above reactions were analyzed by TLC. No pattern exactly duplicated another pattern, although some common features were seen. The only products common to all the reactions were the epimeric 7-hydroxycholesterols; this product is the most likely to be encountered. Not all the reactions produced the other important products of cholesterol oxidation--7-ketocholesterol and 5α-cholestane-3β,5,6β-triol. Only reactions involving solid cholesterol samples produced 25-hydroxycholesterol.

The authors believe that the instability of cholesterol in air, the rapidity with which oxidation takes place, the effect of heating, aging or irradiating on cholesterol samples, and the extreme complexity of the oxidation products make rigorous control analyses absolutely necessary in all biochemical work with cholesterol. They report that the TLC techniques described in the present paper allow the accomplishment of such control analyses. [50 references]

7.80

were markedly less than the level at 0.2-0.5 mg. per g. found in a sample of L. helicina. The level of DMPT might be modified by the proportion of L. helicina to other food and the extent of degradation of DMPT in the stomach of the fish. The similarity of results for salmon and cod stomach contents suggested that the present levels of DMPT might be considered as typical for fish eating L. helicina. If this conclusion is true, then the maximum probable level of DMPT in cod flesh as determined in this study would only be a tenth of that in fillets used in cooking experiments where deleterious effects on taste were observed. Thetin deposits will probably not be a serious problem in blackberry cod.

7.80 COMPARATIVE STUDIES WITH THE 'INTELECTRON FISH TESTER V' AND CONVENTIONAL CHEMICAL EVALUATION OF FRESHNESS

Vyncke, W.
Dt. Lebensmittelrdsch. 62, 46-50 (1966)
Journal of the Science of Food and Agriculture 17, No. 10, 11-193 (October 1966)

Twenty samples of five different species of fish were layered with ice 3-8 days after capture, and stored for 8 days in a cold room at 1°. The samples were evaluated for freshness at various intervals with an electronic fish tester and by determinations of total volatile bases, trimethylamine, n of clear eye fluid, and by sensory evaluation. The comparative results obtained show that the results obtained with the electronic fish tester were a good index of freshness of cod, redfish, ling, and plaice, but were not satisfactory for herring.
[Abstracter: M. F. Tripple]

ENVIRONMENT FACTORS AFFECTING SALMON SURVIVAL

EVALUATION OF FISH FRESHNESS

2.9 (*)

EXPERIMENTAL PARALYTIC SHELLFISH POISONING

Anonymous
Nutrition Reviews 24, 127-128 (April 1966)

When the occurrence of natural toxic materials in or on food products results in an outbreak of food poisoning, the attention of the general public is focused on the toxic materials. For example, an increasing interest in mold toxin has developed since the appearance of problems associated with aflatoxin produced by Aspergillus flavus.

However, other toxic materials occur in foods and cause intoxication. Several outbreaks of paralytic intoxication along the Pacific Coast of North America were reportedly caused by the toxic products of some plankton that was consumed by mussels and clams. The toxin has been isolated, and its empirical formula, $C_{10}H_{17}N_7O_4$, has been worked out.

Toxicity of this material for mice was shown when 0.3 µg. of the toxin was injected into mice weighing approximately 20 grams. The mice survived for from 6 to 7 minutes after injection; generally their death was attributed to respiratory failure. Before death, however, the mice exhibited signs of muscular weakness and frequently had convulsions.

Because humans are periodically poisoned by the toxin, interest in its specific action is high. The specification of the toxin is now known. Kellaway (1935) suggested action at the neuromuscular junction. Evans (1965), studying the effect of the toxin on isolated muscles, both in mammals and reptiles, found that the toxin appeared to act directly on the muscle to produce a paralysis by abolishing muscle-action potential. [Abstracter: M. F. Tripple]

*Items on back of card.

3.331 (*)

OLIVE OIL FOR TUNNY FISH CANNING

Cucurachi, A.
Rivista. Ital. Sostanze Grasse 43, 335-342 (1966) (Milan, Italy)
Journal of the Science of Food and Agriculture 18, No. 3, i-115 (March 1967)

The oil content and fatty acid composition of oil from various species and muscles of tunny fish were determined. Twenty-seven components were identified, ranging from C_{10} to C_{22}. Some muscles from the bluefin species of tuna showed a high content of oil. The deterioration of the olive oil used in canning was proportional to the oil content of the fish used. The tunny fish oil had a low linoleic acid content of ↓2 percent, which allowed the determination of the purity of the olive oil used for covering. The use of groundnut oil for canning also was examined. [Abstracter: M. M. Gwin]

*Items on back of card.

3.336 (*)

DETECTOR CUTS DUDS OUT OF CANNING LINE

Anonymous
National Fisherman 48, No. 3, 14-C (June 1967)

An electronic device detects and segregates irregular cans of salmon as they pass it. The unit is primarily intended to detect cans with insufficient vacuum, but it will also spot overfilled or otherwise irregular cans. When a can moves past the inspection point, one sensor contacts the edges of the end of the can and acts as a zero reference point. A second sensor measures the distance to the end of the can. If the end of the can is not a predetermined distance from the sensor, a switch is activated and the can is pushed off the line. The unit is accurate to within ±0.005 inch and may be set to reject any can on which the end deflection is less than that specified for cans of that size. The device can handle cans quickly enough to keep up with labeling machines. It requires only one operator.
[Abstracter: E. R. Weissman]

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4.29 (*)

STUDIES ON THE FORMATION OF HYDROCARBONS IN FATTY ACIDS AND FATTY ACID ESTERS IRRADIATED WITH UV RAYS

Lück, H. (Animal Husbandry and Dairy Research Institute, Irene, Transvaal, South Africa), Q. Nahar Rahman, and R. Kohn (Munich, Germany)
Fette-Seifen Anstrichmittel 68, No. 12, 1030-1031 (December 1966) (In German, English abstract)

Volatile compounds in the unsaponifiable matter and steam distillates of ultraviolet (UV)-irradiated saturated fatty acids and fatty acid esters were investigated. Irradiation in air, and under vacuum, with other substances present, caused unsaturated hydrocarbons to form. These unsaturated hydrocarbons were probably 1,2 alkenes whose chains were shorter by 2 carbon atoms than the corresponding fatty acids. The volatile compounds in the unsaponifiable matter of the UV-irradiated oleic acid were primarily carbonyl compounds. [18 references]
[Abstracter: M. M. Gwin]

*Item on back of card.

3.331 TUNA CANNING

Anonymous
FAO Cons. Gen. Pêches Méditerranée Tech. Pap. No. 44, 7, 427-434 (1963) (In French)
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 2015, p. 373 (August 1966)

This article discusses the canning of fresh, frozen, raw, and cooked tuna. The chemical composition of tuna is given.

4.29 REMOVAL OF FATTY ACIDS FROM SERUM ALBUMIN BY CHARCOAL TREATMENT

Chen, Raymond F. (Laboratory of Technical Development, National Heart Institute, Bethesda, Maryland)
Journal of Biological Chemistry 242, No. 2, 173-181 (January 25, 1967)

The fatty acid contents of 26 different serum albumin preparations from different species and commercial sources were determined. Some preparations had little fatty acid contamination, whereas others contained between 2 and 3 moles of fatty acid per mole of protein. When the contaminated samples were treated with charcoal at low pH, the fatty acids were removed completely. Conditions for such treatment are a function of the type of fatty acid, pH, and the amount of charcoal. The amount of protein adsorbed onto charcoal was 4.9 percent, whereas the same treatment under optimal conditions removed at least 99 percent of albumin-bound radioactive fatty acids. As judged by a number of criteria, the protein that remained in solution after separation from charcoal appeared to be native protein. Any impurities present in human serum albumin samples can be removed by charcoal at neutral pH. The acid-charcoal treatment would appear to be a more rapid and gentle method of removing lipid impurities than other methods are. [37 references]
[Abstracter: M. M. Gwin]

2.9 A FOOD POISONING CAUSED BY THE ROE OF STICHAEUS GRIGORJEWI. I - TOXICITY OF THE ROE OF STICHAEUS GRIGORJEWI

Sakai, Minoru, Takahisa Kimura, Haruo Shinano, Yoshio Ezura, Masamoto Ban, and Isao Hayashi (Hokkaido Univ., Sapporo, Japan)
Chemical Abstracts 62, 13669h (May 24, 1965)

II - The properties of the extracted toxic lipid.--Ibid. 13670a.

III - Antigenicity of the toxic substance and experimental therapy test for mice inoculated with toxic substance.--Ibid. 13670b.

3.336 MACHINE FOR CANNING FISH

British Patent 1,043,411
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 2715, p. 508 (November 1966)

A machine for canning fish of delicate flesh has been developed. This machine has a rotatable drum with holders for packing the fish; a forming drum, which rotates in the same direction as the first drum, and with sockets for the cans; a means for conveying the fish; and means for filling the cans.

7.594 (*) GAS CHROMATOGRAPHIC AND MASS SPECTRAL IDENTIFICATION OF SOME VOLATILE COMPONENTS OF GAMMA-IRRADIATED MILK FAT

Khatri, L. L., L. M. Libbey, and E. A. Day (Department of Food Science and Technology, Oregon State University, Corvallis)
Journal of Agricultural and Food Chemistry 14, No. 5, 465-469 (September-October 1966)

Milk fat was sealed in cans under vacuum and irradiated at 4.5 Mrad with cobalt 60. The irradiated fat was analyzed for monocarbonyls by forming its 2,4-dinitrophenylhydrazone derivatives. Volatiles of the irradiated milk fat were obtained by vacuum-steam distillation; the components in the distillate were extracted with ethyl ether and separated by gas-liquid chromatography (GLC). Rapid-scan mass spectrometry and GLC were used for identification of the compounds. Among the compounds identified were n-alkanes, 1-alkenes from C-5 to C-17, some alkadienes, n-alkanals, short-chain fatty acids, and certain γ- and δ-lactones. The mechanisms involved in the formation of these compounds are discussed. [32 references] [Abstracter: M. F. Tripple]

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7.594 METHODS FOR THE ESTIMATION OF GLYCEROL IN NEUTRAL GLYCERIDES, PHOSPHOLIPIDS, AND CARDIOLIPINS BY GAS-LIQUID CHROMATOGRAPHY

Holla, Kadambar Seetharama (Ohio State Univ., Columbus, Ohio)
Chemical Abstracts 63, 10301g (October 11, 1965)

7.595 (*) QUALITATIVE ANALYSIS OF ANTIOXIDANTS BY THIN-LAYER CHROMATOGRAPHY

Van der Neut, J. H., and A. C. Maagdenberg
Plastics 31, No. 339, 66-67 (1966)
Abstracts from Current Scientific and Technical Literature 20, Abstract No. 1, p. 3 (January 1967)

The Plastics Research Institute,T.N.O., Delft, Netherlands, has developed a procedure for the investigation of antioxidants, which are important additives in many plastic materials. Thin-layer chromatography has proved to be the most suitable technique for this purpose. This research is important in assessing plastic materials for the packaging of foodstuffs. The procedure is described and a scheme of analysis given.

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8.59 (*) DISTRIBUTION OF LECITHINASE IN THE SUBCELLULAR FRACTIONS OF RAINBOW TROUT (SALMO GAIRDNERII) LATERAL LINE MUSCLE

Bilinski, E., and R. E. E. Jonas (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver 8, British Columbia)
Journal of the Fisheries Research Board of Canada 23, No. 11, 1811-1813 (November 1966)

This study reports on the subcellular distribution in rainbow trout lateral line muscle of the enzyme that hydrolyses lecithin with the liberation of glycerylphosphorylcholine. The authors found that lecithinase occurs in various subcellular fractions of the muscle, with the highest concentration in a fraction exhibiting sedimentation characteristics of microsomes. [11 references] [Abstracter: E. R. Weissman]

*Items on back of card.

8.59 PURIFICATION AND PROPERTIES OF AN α-AMYLASE FROM THE HEPATOPANCREAS OF CARCINUS MAENAS, THE COMMON SHORE CRAB

Blandamer, Alan, and R. B. Beechey (Univ. Southampton, England)
Chemical Abstracts 64, 20083b (June 20, 1966)

9.13 (*) UREA AND ITS FORMATION IN COELACANTH LIVER

Brown, G. W., Jr., and Susan G. Brown (Department of Biochemistry, University of Texas Medical Branch, and Tiburon Co., Biomarine Preparations, Galveston 77550)
Science 155, No. 3762, 570-572 (February 3, 1967)

About 1.7 percent, by weight, of the liver of the coelacanth Latimeria chalumnae is urea. This amount was determined by reaction of the liver with 1-phenyl-1, 2-propanedione-2-oxime (Archibald reagent) and by measurement of ammonia released when the liver is treated with urease. Arginase and ornithine carbamoyltransferase, essential enzymes in the formation of urea in typical ureotelic vertebrates, are found in homogenates of coelacanth liver. Because urea is formed in part by the ornithine-urea cycle, urea may have an osmoregulatory function in the coelacanth as it does in elasmobranchs. [23 references] [Abstracter: M. M. Gwin]

*Items on back of card.

9.13 PATHWAYS OF UREA SYNTHESIS IN THE ELASMOBRANCH, SQUALUS ACANTHIAS

Schooler, J. M., L. Goldstein, S. C. Hartman, and R. P. Forster (Mount Desert Island Biol. Lab., Salsbury Cove, Maine)
Chemical Abstracts 65, 4146f (August 1, 1966)

7.595 THE INFLUENCE OF PRO- AND ANTIOXIDANTS ON THE CELL GROWTH OF MOULD FUNGUS, ASPERGILLUS FUMIGATUS FR. AND ON THE FAT METABOLISM

Kaufmann, H. P., and C. V. Viswanathan
Fette Seifen AnstrMittel. 67, No. 8, 563-566 (1965) (In German)
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 335, p. 65 (February 1966)

The procedure described permits identification of the alcoholic constituents of fatty acid esters.

7.594 MICRODETERMINATION OF CHOLESTEROL BY PAPER STRIP DEPROTEINIZATION

Manova, L., V. Dolezal, and K. Kacl
Z. Chemie, Lpz. 4, 187-188 (1964) (In Czech.)
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 8, p. 4 (January 1966)

Blood or serum is deproteinized by being spotted on paper; the paper is immersed in a solution of ethanol and ether and evaporated. The cholesterol is then extracted with chloroform and determined by the colorimetric method of Liebermann-Burchard.

9.13 BIOSYNTHESIS OF SQUALENE AND STEROLS IN FISH

Blondin, G. A., J. L. Scott, J. K. Hummer, B. D. Kulkarni, and W. R. Nes (Clark Univ., Worcester, Massachusetts)
Chemical Abstracts 64, 16340d (May 23, 1966)

8.59 LACTATE DEHYDROGENASE OF TROUT: HYBRIDIZATION IN VIVO AND IN VITRO

Goldberg, Erwin (Department of Biological Sciences, Northwestern University, Evanston, Illinois)
Science 151, No. 3714, 1091-1093 (March 4, 1966)

Speckled trout and lake trout both contain five forms of lactate dehydrogenase (LDH), but each species is characterized by a different electrophoretic distribution of isozymes. Fertilizing lake trout eggs with speckled trout sperm produces the hybrid splake, which contains nine isozymes. This complement of isozymes in vivo could be produced in vitro by recombination of subunits from parent species tissues. It could also be the result of heterozygosity at the gene locus involved in synthesis of LDH-5 in the splake trout. Extracts of trout eyes contain at least two forms of LDH that were not seen in other tissues.

[Abstracter: M. F. Tripple]

2.03 HYPOXANTHINE IN THE MUSCLE OF CHILL-STORED ATLANTIC SALMON (SALMO SALAR)

Murray, J., N. R. Jones, and J. R. Burt (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Journal of the Fisheries Research Board of Canada 23, No. 11, 1795-1797 (November 1966)

The relation of hypoxanthine level to flavor in the Atlantic salmon (Salmo salar) was investigated. The enzyme system showed a marked degree of temperature dependence. Correlation of hypoxanthine level to flavor was found to be poorer with Atlantic salmon than with most other species examined. This poor correlation may be due to a relatively high fat content in the salmon, which produces a different spoilage pattern. [Abstracter: E. R. Weissman]

(Abstract of this article appears under 1.81 page 3 - November 1966)

Mori, Katsuyoshi, Hideo Tamate, and Takeo Imai
Tohoku Journal of Agricultural Research 16, 147-153 (September 1965)

2.03 PRESENCE OF 17β-HYDROXYSTEROID DEHYDROGENASE ACTIVITY IN THE TISSUES OF MATURING OYSTERS

2.114 TOWING AND HOISTING CRANE FOR FISHING VESSEL

Anonymous
Marine Engineering and Shipbuilding Abstracts 28, No. 4, 71 (1965) (London, England)
World Fisheries Abstracts 16, No. 3, 25-26 (July-September 1965)

A crane for fishing vessels consists of a first, or lower, boom pivotally connected at one end to a second or upper boom. The upper boom has two parts. The pivoting action of the first and second booms can be obtained by means of a hydraulic system, the cylinder part of which has one end connected to the lower boom and the rod part of which has the free end pivoted to the lower portions through a bracket. The lower boom is fixed to the deck by being pivotally joined to a base. It can be pivoted in any conventional manner (the one illustrated consists of another hydraulic piston, the cylinder of which has one end pivotally connected to a base plate and the free end joined to a portion of the lower boom). One of the main features of the invention is that the pivot axis of the lower boom is usually parallel to the side railing of the ship and is normal to the pivot axis of the upper boom. Therefore, the upper boom can move up and down in a plane that is normal to the plane in which the lower boom moves. A hoisting-wire guide is provided on both the lower boom and the upper boom. [Extractor: L. Baldwin]

3.34 LOWER TEMPERATURE FOR STORING CANNED FISH

Anonymous
Fd. Ind. S. Afr. 18, No. 9, 68 (1966)
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 1329, p. 245 (May 1966)

The air in stores can be lowered at little cost by providing air locks at entrances, reducing ventilation to a minimum during the day; and by installing fans that switch on when the outside air is 2° lower than the room temperature.

This apparatus consists of a vacuum gauge, an adapter with a bleed valve, and a detachable sterilizable piercer.

Dilley, A. E., and J. R. Everton
Lab. Pract. 15, No. 3, 318-319 (1966)
Abstracts from Current Scientific and Technical Literature 19, Abstract No. 1799, p. 331 (July 1966)

3.36 A PUNCTURE APPARATUS FOR THE ASEPTIC MEASUREMENT OF VACUA IN FOOD CONTAINERS

4.19 BLOOD LIPIDS OF THE LOBSTER, HOMARUS AMERICANUS

Bligh, E. G., and Margaret A. Scott (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 23, No. 10, 1629-1631 (October 1966)

Heavy mortalities periodically occur among lobsters stored for shipment. Many of the losses are caused by a septicemic disease, gaffkaemia, which is the result of infection by the bacterium Gaffkya homari. Heavily infected lobsters suffer a disappearance of the hemocytes, prolonged hemolymph clotting times, reduced hemolymph viscosity, and eventual death. A knowledge of the normal lobster hemolymph clotting mechanism and the mode of interference by the infective agent is important to a study of gaffkaemia. This report is intended to supply information on the lipid composition of lobster hemolymph to aid studies on the lobster hemolymph clotting mechanism.

The results showed that phospholipids make up about 65 percent of the lipids in lobster hemolymph, with phosphatidyl choline and phosphatidyl ethanolamine as the major lipid constituents. The neutral lipids were mainly triglycerides and free sterols, with each lipid representing about 15 percent of the total lipid. No esterified sterols were detected during the analysis. [8 references]
[Abstracter: M. F. Tripple]

6.139 CHANGES OF SOME NITROGEN COMPOUNDS DURING THE PRODUCTION AND STORAGE OF FISH FLOUR

Podeszewski, Zbigniew (Agr. School, Olsztyn, Poland)
Chemical Abstracts 63, 17038a (December 6, 1965)

6.139 MODIFICATION OF THE FROELICH TEST FOR THE ESTIMATION OF THE DEGREE OF HEATING AND OVERHEATING OF SOYBEAN MEAL

Delort-Laval, J., and J. Kaschtges (Inst. Natl. Rech. Agron., Paris, France)
Chemical Abstracts 64, 10328a (March 28, 1966)

6.139 EFFECT OF HEAT ON THE AMINO ACID, FATTY ACID, AND B-VITAMIN COMPOSITION OF FISH MEAL

Mason, V. C., and Kirsten Weidner (Natl. Res. Inst. Animal Husbandry, Copenhagen, Denmark)
Chemical Abstracts 61, 11246b (October 26, 1964)

7.45 EDTA TITRATION OF CALCIUM AND MAGNESIUM

Steagall, Edward F. (Food and Drug Administration, Chicago, Illinois 60607)
Journal of the Association of Official Analytical Chemists 49, 287-291 (April 1966)

A revised method for the ethylenediaminetetraacetate titration of calcium or for magnesium has been subjected to collaborative study. Three simulated pharmaceutical mixtures and a sample of tomato juice were analyzed by 10 analysts in 9 laboratories. The results were easily reproducible. Agreement between laboratories was good. It would appear that the problems of turbidity and fading end points have been resolved. [Abstracter: M. F. Tripple]

7.45 FLAME-PHOTOMETRIC DETERMINATION OF POTASSIUM IN TISSUES OF FISHES

Buyanov, N. I.
Chemical Abstracts 63, 17038e (December 6, 1965)

7.51 MODIFIED METHOD FOR RAPID DETERMINATION OF INDIVIDUAL MONONUCLEOTIDES

Macy, Robert L., Jr., and Milton E. Bailey (Department of Animal Husbandry, University of Missouri, Columbia)
Food Technology 20, No. 3, 114-115 (March 1966)

A method of ion-exchange chromatography is described for the separation and quantitative analysis of 5'-mononucleotides. Five mononucleotides commonly found in foods can be analyzed in half the time required by similar procedures. Four samples can be analyzed daily by use of 2 columns and 1 fraction collector. [Abstracter: M. F. Tripple]

7.51 MICRODETERMINATION OF PROTEINS, USING THE XANTHOPROTEIC REACTION

Surinov, B. P., and V. I. Zheludov (Chem.-Pharm. Inst., Leningrad, U.S.S.R.)
Chemical Abstracts 64, 7027g (February 28, 1966)

7.522 ION-EXCHANGE THIN-LAYER CHROMATOGRAPHY XIV - SEPARATION OF NUCLEOTIDE SUGARS AND NUCLEOSIDE MONOPHOSPHATES ON PEI-CELLULOSE

Randerath, K., and E. Randerath (Biochemical Research Laboratory and John Collins Warren Laboratories of the Huntington Memorial Hospital of Harvard University, Boston, Massachusetts)
Analytical Biochemistry 13, 575-579 (December 1965)

Previous work by the authors (1964) had shown that nucleotide sugars could be separated according to the base and phosphate moieties on polyethyleneimine (PEI)-cellulose anion-exchange thin layers. Verachtert et al. (1965) obtained similar results with PEI-paper. However, because substance zones on ion-exchange plates are more sensitive and more distinct than they are on ion-exchange paper, the authors developed a fast thin-layer method capable of resolving complex mixtures of nucleotide sugars and nucleoside monophosphates. The method, outlined in this paper, can be used to assay incubation mixtures and tissue extracts. 12 references. [Abstracter: M. F. Tripple]

7.522 THE FLAVOR COMPOUNDS IN VARIOUS FOODS. IV - THE FLAVOR SUBSTANCES OF OCTOPUS (OCTOPUS VULGARIS)

Take, Tsuneko, and Hitoshi Otsuka (Univ. Niigata, Japan)
Chemical Abstracts 65, 4525e (August 1, 1966)

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U.S. DEPARTMENT OF THE INTERIOR

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Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.